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Logic

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Mac™ OS

Addendum
Version 3.0
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Welcome to Logic Audio 3.0

Finally: Logic Audio 3.0 is here.

Please start the Installer/Updater and follow the instructions on the screen. Previous program versions will not be deleted from your disk.

This addendum explains the new functions found in Version 3.0, so please check the table of contents for an overview.

Please also check the installed read me file »Update Info«. It contains the latest information that didn't make it into this addendum.

We would like to thank all beta testers and users around the world – your continued feedback is invaluable in making Logic Audio the leading music production system.

We wish you and your music all the best when using Logic Audio 3.0!

Your Emagic Team.

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Chapter 1
MIDI Functions

Chapter 2
Notation and Score

Chapter 3
Tempo and Synchronization

Chapter 4
Audio Functions

Chapter 1
MIDI Functions

1.1   Arrange Window

Display Options for the Track List

You can use the **View** menu to show or hide various parts of the track list:

Track numbers / Level meters

To show or hide track numbers and level meters.

Mute Switch

The track-mute function has its own switch. A muted track is marked with an »M« (mute).

As in past versions, if the mute switch is hidden, you can mute a track by clicking to the left of the track number. A muted track is marked with a » • «.

Record Audio Switch

This switch allows you to place audio tracks in record enable mode (please refer to Abschnitt *Record Audio Switch* ab Seite 1 - 8).

Instrument Icon

The track instrument icons are now shown in the relevant color. With very light colors a dark grey icon with a colored shadow is used to improve the contrast.

Color of the Instrument Icon

The color of the selected track's instrument icon can now be altered using the usual color palette via: **View > Object Colors…**, providing, no Arrange object (sequence) is selected.

Even if sequences are selected, you can alter the color of the instrument icon by ⌘-clicking.

> The color of the instrument icon serves as the default color for all sequences recorded on this track.

Shadow for Instrument Icon

The instrument icons are now displayed with a shadow. However, some icons contain text and are more legible without a shadow.

Instrument Name and Track Name

Hiding one of the names makes more horizontal space available. To distinguish them, the instrument name is always shown in bold type. One of the two names is always hidden.

Horizontal Layout

If both the instrument and track names are shown, the names are divided by a line. You can move this dividing line by grabbing the top of the marker with the mouse.

Instrument and Track Name stacked on each other

Whenever one of the names are hidden, if you zoom in enough vertically, you will be shown both names, one on top of the other: the instrument name (in bold) on top, the track name below.

Sorting the Tracks

As with earlier versions, you can sort the tracks by grabbing the track number and moving it vertically. Now you can use the right edge of the name for sorting as well.

Here are the rest of the track list functions involving names:

Selecting a Track Instrument

You can select the track instrument by click-holding the left half of the name or the icon .

Opening the Environment Window for an Instrument

You can open an Environment window with the relevant instrument by double-clicking the instrument name.

Editing Instrument Names

You can edit the instrument names by ⌥-double-clicking directly in the track list. You can also use the instrument parameter box.

Editing Track Names

You can edit the track names by ⌘-double-clicking directly into the track list – even if only the instrument name is shown there.

Skip Cycle

You can now skip a passage while you are playing a song. This is useful for checking the musical effect of transitions between different sections.

Simply move the left locator behind the right locator. The skip region will then appear as a thin strip at the top of the bar ruler.

When the SPL reaches the right locator, it immediately jumps to the left locator.

Unlike earlier versions, when you draw a normal cycle region in the bar ruler you now have to drag from left to right.

You draw the skip cycle region in the bar ruler by dragging from right to left.

Linear Quantize

»Linear Quantize« is a new quantize algorithm which is always used automatically whenever you set a positive value in the »Q Range« parameter.

The »Q Range« parameter is located in the extended sequence parameter box, which you can open by choosing **Options** > **Extended Sequence Parameters**.

Operation

Linear Quantize is well-suited to »soft quantization« of recordings which already have the right groove but in some places are too hurried or »laid back«. Linear Quantize retains the original feeling, but positions the rhythmic »corner stone« precisely in the groove.

To obtain the best results, use a low, even quantize value, such as; $1/4$ note. Set the »Q Range« parameter to the maximum error in the recording, for example 96 ticks (= $1/40$ note).

Note   Don't forget, t despite the $1/4$-quantization setting, smaller note values such as $1/32$ or $1/16$-triplets are retained!

Linear Quantize is a very musical quantization strategy that requires a certain amount of technical musical prowess.

Instrument Parameter Box

You can now change the MIDI channel of a part-instrument (»subchannel« or »part« of a multi instrument) in the instrument parameter box of the Arrange window. Previously a warning message was displayed (»Channel is protected«). Now the part-instrument of the track is changed.

> You still can't actually change the receive channel of a part in a multi-timbral synthesizer, However, this is only possible on a few models, and is not particularly useful when operating a multitrack sequencer. The »Cha« parameter is an alternative way of changing the track instrument, to enable the track to play a different part in a multitimbral synthesizer.

If the MIDI channel is set to »All« you can edit the parameters of the whole multi instrument, e.g. the MIDI port.

LOGIC

1

HyperDraw

Quick Delete
You can delete the entire contents by ⇧⌫-double-clicking in the HyperDraw region. This removes all events of the displayed type from the sequence.

Sustain Pedal (Controller 64)
Controller 64 (sustain) is now displayed in a special way in HyperDraw: there is no graph, merely the events »on« and »off«.

Auto Define
Auto Define will not just switch the HyperDraw display to the first incoming controller, but it can now respond to other types of events as well. It responds in this order:

- Controller
- Aftertouch (Channel Pressure)
- Pitch Bend
- Program Change
- Note Velocity

Marker

Newly created markers are now automatically assigned a serial number in their name, i.e. »Marker 1«, »Marker 2« …

These serial numbers are created from the preset name »Marker ##«. The character strings »##« or »###« in a marker's name are then replaced by the serial number.

> A marker's name is its first text line. This appears in the bar ruler, the marker list and the title bar of the Marker Text window.

The serial number corresponds to the key command »Goto Marker Number...«.

The key command »Goto Marker Number...« has now been extended from the first five markers to the first twenty markers.

> The »Goto Marker number...« command, positions the SPL at the marker and sets the cycle regions accordingly.

New Functions

Creating a Track with the Next Instrument

The **Structure > Track > Create with next Instrument** function, creates a new track under the selected track and assigns it the next instrument from the instrument selection. It normally allocates the next MIDI channel in the same sound module.

You can also hold down the ⌥ key when you create a new track by double-clicking under the track list. Or, you can use the *»Append Track with next Instrument to Track List«* command.

Moving Objects onto a Track

The function **Structure > Track > Move Selected Objects to Track** moves all selected sequences from different tracks onto the selected track. The time position of all the sequences is retained.

This is useful for displaying sequences in a stave or gathering together regions of different vocal takes.

Selecting Objects of the same color

If you have selected a sequence of a certain color you can use the **Edit > Select equal colored objects** command to select all other objects of that same color. For example, this is useful for compiling mute and solo groups based on color.

New Key Commands

»Convert Regions to Individual Regions« All selected regions are individualized and their start and end-points can be altered without affecting other regions in the Arrangement.

»Convert Regions to individual Audio Files« All selected regions are stored as individual audio files and can be destructively edited in the Sample Editor without affecting other regions in the Arrangement.

As well as the ⌘7 command you can now define another key command of your choice for *»Open Arrange Window«*.

In all windows with a horizontal time axis (Arrange, Matrix...) you can use the global command *»Play from left window corner«* to start playback at the beginning of the visible area.

Logic

1

1.2   Editors

New Functions in all Editors

Goto Selection

The key command *»Goto Selection«* sets the SPL to the position of the first selected event in the top window. This command is very useful for step recording.

Select Equal Subpositions

You can now select all events with a certain relative position, e.g. all snare drums on the off-beat.

Select one of the events at the desired relative position and choose **Edit > Select Equal Subpositions**. All events, in all bars within the sequence, with the same relative position in a bar, are selected.
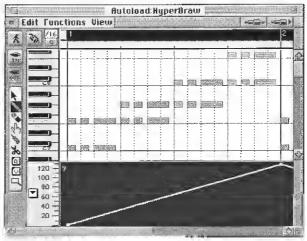
You can use this function for up to 10 relative positions simultaneously.

New Key Commands

»Event channel +1« or *»Event Channel -1«* alter the channel number of the selected event by one. The commands are covered in the section »Arrange and various Sequence Editors«.

HyperDraw in the Matrix and Score Editors

In the Matrix and Score Editors you can use the **Uiew > HyperDraw...** command to insert a HyperDraw display. This allows quick and easy editing of controller data in relation to note data.

Once you have inserted the HyperDraw display, you can choose the type of event you want displayed via the arrow menu on the left.

You can adjust the size of the HyperDraw display by grabbing and vertically moving the dividing line.

Hyper Editor

Meta Event Support

Meta Events can also be displayed, added and edited in the Hyper Editor's event definition.

Event Editor

Scrolling

With either of the two scroll buttons, holding down the mouse button and vertically moving the mouse allows you to vary the scrolling speed or even change the direction of scrolling, just like the tape buttons in the Transport window.

1

Grey Background
The Event list has now been made easier by incorporating a grey background.

1.3   Environment

Mixer Automation

There are now extended automation functions for all faders in the Environment. As with mixing desk automation, there are three modes: Merge, Replace and Update. Thus existing fader movements can be altered in real-time using the same faders.

Options	
Mixer Automation	Merge
goto previous Layer	✓Replace
goto Layer of Object	Update
Reset Selected Faders	Soft Fade Time...

Merge
Newly-written, data is merged with existing data. This mode corresponds to the operation in previous versions.

Update
In this mode, only the relative changes in the new movement are incorporated.

Replace
In this mode, existing data are replaced by the new movement.

The data is replaced for exactly as long as the mouse button is held down.

Soft Fade Time
If, for example, you release the mouse button after carrying out a replace

Mixer Automation	
Soft Fade Time [ms]	1/ 4

operation and the fader value is different from the old value at this point (or afterwards), the current value is faded to the old value over a period of time (you can set this in the Environment: **Options > Mixer Automation > Soft Fade Time...**). This ensures that there is no sudden jump in level.

Choosing the Automation Mode

You can set the automation mode either in the Record Switch menu, or in the Environment (**Options > Mixer Automation > ...**).

Correcting the Automation

Example   If you want to change a recorded fader movement:

- Go to the Arrange window and select the sequence(s) in which the fader movements were recorded.

  Even if these sequences contain other controllers or notes, those events will not be affected.

- Make sure you have chosen the desired automation mode, e.g. »Replace«.

- Start MIDI recording in, the usual way via the button or key command.

- Click the fader you want to change and carry out the alteration. If you have chosen »Replace«, the old movement will be replaced by the new one for as long as the mouse button is held down.

Multi Instruments

Bank Select

A few Bank Select formats have been added (Roland JV-2080).

MIDI Port

In the Instrument parameter box (including mapped and multi instruments) is a separate line for selecting the MIDI port.

For fully-fitted Unitor8 systems with 8 cascading devices, the choice of MIDI ports in Instruments, has now been increased to 0-63 (previously: 0-31).

The 8th output of the 8th Unitor8 can only be addressed by cable via a modem or printer port object.
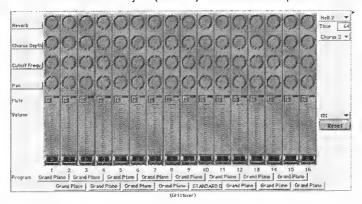
Default Volume

With newly created instruments, the volume is set to 100 (previously: 127).

Logic

GM/GS/XG Mixer

1

The layout of the GM mixer has been adapted to the new audio objects. If you want to keep the layout and design of your old Environment, you can switch to the older styles (2 and 3) in the GM mixer parameter box.

(GM Mixer)

The bank selects are now situated under the program names. They can be hidden if necessary since they don't apply to pure GM synthesizers.

Don't forget, with a preset GM mixer in style 1, you have to enlarge it by dragging the bottom right corner before you can see the bank select buttons. You also have to switch on the bank select display in the GM mixer parameter box.

Note

The row of pots above the pan-pots are now preset to Controller 74 for the filter cut-off frequency (previously preset to Controller for portamento).

Remember that only GS or XG synthesizers have modulation filters (not straightforward GM synthesizers).

Note

Meta Events for Faders

Meta events are generally only of interest to experts in the Environment. You don't need to utilize them to make good music.

Note

With some new meta events, i.e. Logic-internal commands, faders can be affected regardless of their in-definition. It is therefore irrelevant whether the meta events originate from other faders or are created in the Event List. Please refer to the manual for instructions on how to create meta events.

A new feature is the option of creating meta events by transforming some other event using a " Transformer".

Set Fader Minimum (#96) or Maximum (#97)

You can program the value-range of a fader by using meta event #96 to set the minimum value, and meta event #97 to set the maximum value. The respective value is conveyed by the data byte.

Use: if a fader is used for different parameters (e.g. Controllers affecting various parameters in different effect's algorithms), you can use this command to adjust the value ranges of the relevant parameters.

Silent Fader (#98)

This meta event allows a fader to be set to any value without the fader transmitting its out-definition.

This is useful in conjunction with the fader "bang" command.

Fader "Bang" (#99)

When a meta event #99 ("bang" command) is received, the fader is made to transmit its present value in accordance with its out-definition.

There are various options depending on the "bang" command's databyte (byte -2-):

0	the current fader value is transmitted.
127	the current fader value is increased by 1 and then transmitted. The fader's range parameter defines the maximum value.
126	as 127; in addition a "bang" command is sent to all subsequent faders.
125	the current fader value is reduced by 1 and then transmitted. The fader's range parameter defines the maximum value.
124	as 125; in addition a bang command is sent to all subsequent faders.
123	the current fader value is increased by 1 and then transmitted. The fader's range is swept in a cycle, i.e. when the fader reaches maximum it starts again at minimum.
122	as 123; in addition a bang command is sent to all subsequent faders.

121	the current fader value is reduced by 1 and then transmitted. The fader's range is swept in a cycle, i.e. when the fader reaches minimum it starts again at maximum.
120	as 121; in addition a "bang" command is sent to all subsequent faders.
1-119	reserved for future extensions.

The command **New > Fader > Specials** creates a knob which transmits meta event #99, and whose minimum and maximum values are set to 0. When you click this knob, it causes the subsequent fader to transmit its current value. If you set both range values to 127, the "bang" command is sent to all subsequent faders.

The fader "bang" command (meta event #99) is very useful for doing edits in the Environment where the previous values of events play a roll (»faders as recallable value storers«).

Transformers

Condition: Map
There is a new condition setting: »Map«. Incoming event components are immediately routed via the map before the evaluation takes place. The two »Range« parameters then work the same as »Inside«. Incoming events whose mapped value lies within the range fulfil the condition – all others do not.

Meta Events
"Transformers" can now also process meta events, for both condition and operation.

Status Operation: Map Set
This new operation for the status of an event allows the universal map of a subsequent transformer to be controlled.

The value of » -1- « selects the position in the map.

The value of » -2- « determines the value at this position of the map.

Internally Logic sends a meta event pair: #123 with the position and #122 with the value at this position. These meta events for altering a Transformer's map can also be created in other ways.

1.4   Other New Features

Permanent Pull-down Menus

All local menus can be opened by a short click with the mouse. They then stay open without you having to hold down the mouse button. A long click with the mouse makes the menus behave as with previous versions.

> This also applies in MacOS 8 to the main menus controlled by the operating system.

New Preferences

The new option »Enable Catch when moving SPL« means that when you move the SPL, the Catch function (screen view follows SPL) is switched on (= preset).

Small Improvements

Sequence names more legible
If an Arrange object is a very dark color, the name is now shown in white letters. When you select one of these objects, to make it more legible, the color is dispensed with in favor of white letters on a black background.

Editor window - warning messages ignored
If a screenset with a linked Matrix or Hyper Editor is called up without a sequence being selected a warning is no longer given; instead the editor is opened with an unselected sequence. If there is no sequence, the Editor is initially opened on the Arrange level. The display then changes to a Matrix or Hyper Editor when you double-click a sequence.

Folder
Folder names are now shown in capital letters.

1.5   New Features in Version 2.6

Arrange

Capture Recording
If you play along live during playback and you like what you've played, you can now define it as »recorded«. A sequence will then be created as if you had recorded it normally.

To do this, use the key command *Capture Last Take as Recording.*   🎵

All events played live since the last positioning of the SPL are included in the recording. As soon as you move the song position, the next event received deletes the »Record while Play Mode Buffer«.

Dividing Objects at the Song Position
In the Arrange window all selected objects at the song position are split. There is a key command for this *Split Objects by Song Position,* or   🎵
you can use the menu command: **Structure > Split/Demix > Split Objects by Song Position**.

If you want to split ian object into whole bars, you can use the key command *Split Objects by rounded Song Position.*   🎵

Arrange and Editors

Making Objects the same Length
In both the Arrange window and the Matrix Editor you can already change the length of all selected objects (sequences or notes) simultaneously. The absolute value of the length alteration is the same.

If you want to make all objects the same length, you can now do so by holding down the ⌥⇧ keys while you alter the length.

Environment

Extended Arpeggiator
Some of the parameters for the arpeggiator in the Environment have extended settings:

Direction

UpD2	= Up&Down2. This setting plays the top and bottom notes just once by contrast with *UpDn*.
Rand	All recorded notes are played in random order.
All	The chord is not arpeggiated, but is repeated as a whole (not an arpeggiator but a "Chord Repeater").

Vel

Rand	= Random Velocity. Every recorded note is played with random velocity. The value lies between 1 and the original velocity.

Res

Resolution of the notes.

Rand	= Random Resolution. The notes are played with random time spacing. This is more suited to experimental uses.

Len

Length of the notes.

-Rand	= Random Note Length. The notes are played with random lengths.

Parameter Control

All parameters can be remote-controlled via 10 sequential Controllers, in real-time. The number of the first Controller is defined by the new parameter **Ctrl Base**. The *Off* setting (preset) means: remote-control switched off.

For example, if you set a base of 20, Controller 20 controls »*Direction*«, Controller 21 »*Vel*« ... and Controller 29 »*Crescendo*«.

New Key Commands

Arrange

Normalize w/o channel

Normalize w/o channel & delay

Hyper Editor

Auto Define toggle

Logic

Small Improvements

The track name and instrument name are simultaneously displayed on top of each other, if the vertical zoom allows.

When you copy multi instruments via the clipboard, all relevant information (such as activation and color of part instruments) is retained.

The default song, now contains multi instruments for the modem and printer ports, a mapped instrument connected to channel 10 of the multi instrument, plus initialized tracks in the Arrange window and examples of input processing and a layer instrument.

Autodrop: if the SPL is behind the right drop-point at the start of the recording, it is repositioned to one count-in length before the left drop point where the recording begins.

Button1-type faders are now shown with a cross when they are pushed in.

Score: if MIDI Step Input is switched on, choosing notes from the part box changes the format value (= note value preset for the next note to be added). This changes also the view quantisation, if »Qua« is set to »default«.

Plus many more detailed improvements.

Chapter 2
Notation and Score

2.1 New Input and Paste Functions

Input of Slurs and Crescendi with Key Commands

For slurs, crescendo and decrescendo symbols there are also user defin-
able key commands for quicker input:

- *Insert Slur Up*
- *Insert Slur Down*
- *Insert Crescendo*
- *Insert Decrescendo*

These commands place the according object below or above (*Slur Up*)
the currently selected notes. The beginning and length of the object
are automatically set according to the selected notes. For the shape
and position of each object, the settings of the last edited object of the
same type is used.

To alter the shape of these symbols , you can grab and drag their edit
points (black squares) at any time, even if they are not visible. To make
them visible, select the object by clicking on one of its ends or by using
the "rubber band" selection.

Quick Input of Accents, Staccatos, Fermatas etc. with Key Commands

For the following symbols there are user definable key commands avail-
able which automatically assign the corresponding symbol to all cur-
rently selected notes

- ⌒ *Attach Symbol: Fermata Up*
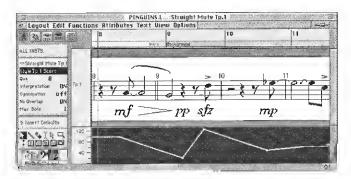- ⌣ *Attach Symbol: Fermata Down*
- · *Attach Symbol: Staccato*

- ˈ *Attach Symbol: Staccatissimo*
- ˃ *Attach Symbol: Accent*
- − *Attach Symbol: Tenuto*
- ˅ *Attach Symbol: Up-Bow*
- ⊓ *Attach Symbol: Down-Bow*
- ○ *Attach Symbol: Flagolet*
- + *Attach Symbol: Pizzicato*
- ● *Attach Symbol: Left Hand*
- ☐ *Attach Symbol: Right Hand*
- ⌣ *Attach Symbol: Soft*
- ⁄ *Attach Symbol: Heavy*

> Hint: Working with these key commands can be even faster when you also additionally use the key commands *Select Next/Previous Event* and *Toggle Next/Previous Event*. The two latter commands include the following or previous event or they reverse that inclusion.

Hyper Draw in the Score Window

The Hyper Draw functions that you know from the Arrange Window have now been included in the Score (and Matrix) Edit Windows : If you activate Hyper Draw in the **View** menu, you can insert and edit MIDI events which otherwise are not displayed, such as: continuous controller data (i.e. volume, pitchbend etc.). A complete description of Hyper

2

Draw features can be found in the section "Hyper Draw" (chapter Arrange Window) in the LOGIC manual.

In the Score Window, Hyper Draw can only be activated in linear view if only one sequence is displayed. If you switch to another mode (page view or full score), the Hyper Draw area disappears. However, the settings are stored, so when you return back to a single sequence and linear view, the previous Hyper Draw setting is recalled.

In the Score Window, the Hyper Draw display is scaled horizontally, exactly in relation to the score display above it. Its height can be changed by dragging the horizontal borderline with the mouse. A corresponding value scale will be displayed in the instrument name column if **View > Instrument Names** is activated.

With Hyper Draw set to *Note Velocity*, the note velocities can be displayed and edited graphically.

Hint

2.2   Display Options

Additional Display Quantize Options

The *Qua* flip menu inside the Display Parameter Box contains some additional display quantize values, which makes it possible to display very short note values: 128, 128/96, 128/192, 128/384.

128
128,96
128,192
128,384

Score Styles without Key Signature

In the Score Style Window you will find the new parameter *Key*. If you choose *Hide*, *the* corresponding staff is displayed without any key signature. Instead, all accidentals are indicated directly next to the notes. Usually this parameter will be set to *Show* the key signature. *Hide* is an option mainly used for instances like transposed french horn parts, which are written without any key signature.

Key
Show

> Note: The *Automatic Key Transposition* option in the *Global Format* window has a similar effect on the whole song . However, the untransposed basic key signature is still indicated, The *Hide Key* suppresses any key signature for a particular staff in a Score Style.

New Options for Page and Bar Numbers

(in the **Layout > Numbers and Names** dialog)

Page Numbers:

- New option for *Hor. Position*: *rev. alternating*. Alternating, but starting on the left side (as opposed to *alternating*, which starts on the right side).

Bar Numbers:

- Negative values for *Vert. Position* will result in the display of bar numbers **below** the staff.

- *Top/Bottom Stoff only*: In full scores, the bar number is only displayed above the top staff if this option is activated (with a negative *Vert.Pos.* value below the bottom staff).

- *Count Mult. Rests*: Displays the first and last bar number below multiple rests as shown in the opposite illustration. This mainly makes sense if a negative *Vert.Position* value is chosen causing the bar numbers to be shown below the staves.

Reset Note Attributes

 With this command, (**Attributes** menu or key command) you can reset all Note Attributes (see corresponding section in the manual) to their default settings.

Note: This also affects symbols directly attached to notes like accents, staccato, fermatas etc., which will be erased by this command!

Chord Symbols

- The New Option of *German Chord Symbols* in **Layout > Global Format**: If this option is activated, the note *B* in chord symbols is generally displayed with its German name *H*. *Bb* however still has to be written as "Bb". This option is also activated automatically as soon as the letter *H* is used during chord symbol input.

- The size of accidentals which are part of the root or bass note of a chord symbol (like in *F#*) now is determined by the font size of the *Chord Root* Text Style, not by the staff size.

2.3   Appearance of the Score

Window

2

Apart from the obvious visual changes of some of the Score Window's elements, there are two other details:

Vertical Headroom

Along the upper border of the main working area you can now create a *vertical headroom* : This is useful when working on parts containing very high notes or symbols above high notes, which might not be visible otherwise and therefore could not be edited. Just grab the top border of the white area (just below the bar ruler) with the mouse and pull it down.

Parameter Boxes

For the parameters in the Display Parameter Box and the Event Parameter Box the opposite of *ON* is now displayed as *off*. (In former versions nothing was displayed here.)

2.4 Other Functions

Changed Detail in Catch Mode

If the sequencer is stopped, *Catch* is not deactivated by selecting or editing events in the score. This makes it possible to move backward and forward during editing by using the *Forward* and *Rewind* key commands with Catch Mode activated . In addition, the new Global Preference option *enable catch when moving SPL* is very useful.

Moving all selected Sequences to one Track

To edit MIDI sequences recorded in real-time for printout, the new function **Structure > Track > Move Selected Objects To Track** (also available as key command) in the Arrange Window can be very useful: All selected sequences are moved to the currently selected track and subsequently in linear view are displayed as staves on the same height in the Score Window. This will usually be used to move sequences

which belong to the same instrument, but were recorded on different tracks. (To get one uninterrupted staff use **Functions > Modify Object Borders > Tie Objects by Length Change** in the Arrange Window.)

Import Settings

The Import Settings dialog window is also available directly in the Score Window. Choose menu **Options > Import Settings**. In the dialog box, activate the desired settings and click on *Import*. With these functions you can import, (among other things) all *Score Styles, Instrument Sets* and/or *Score Settings* of another song into the current song. The term *Score Settings* stands for all settings in the following *Song Settings* dialog boxes: Global Format, Numbers & Names, Keys & Signatures, Guitar Tablature and Extended Layout Parameters .

If another song file is already open during this procedure, that song's settings will be imported. If no other song is open, a file selector box will appear where you can select the song in which the settings occur that you want to import into your current song.

Chapter 3
Tempo and Synchronization

3.1   Tempo

Alternative Tempo Lists

You can use 9 different tempo lists. This is useful in songs with tempo changes, so that you can;

*   temporarily slow down the tempo when recording MIDI sequences,
*   temporarily »switch off« the tempo changes,
*   try out different tempo variations.

To switch between the different tempo lists:

*   Open the tempo list (e.g. via: **Options > Tempo and Synchronization > Tempo List Editor...**)
*   Choose **Options > Tempo Alternatives > 1...9** and select the desired tempo list.

Alternatively, you can use the global key command *Set Tempo Alternative...*. Use the keyboard to enter the desired number (1-9) in the float window and confirm via Enter or Return.
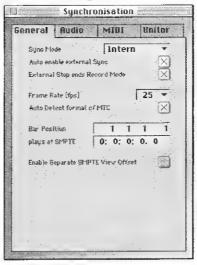
3.2   Synchronization

Synchronization Window

All the relevant synchronization settings are now located in one window.

Not all of the functions are new, but for the sake of being thorough all the parameters are described below.

You can open this window from the Arrange window via **Options** > **Tempo & Synchronization > Synchronization**....

At the top edge you can switch pages: General, Audio, MIDI, Unitor.

General

Sync Mode

This parameter defines the master to which Logic is to be synchronized:

Internal	Logic's internal timer. Logic is the master. External devices can be synchronized via MIDI Clock or MTC (the relevant settings are made in the »MIDI« page).
MTC	MIDI Time Code. Logic runs as a slave. The Midi Time Code can either arrive at a MIDI In port, or be generated by a MIDI interface from »translated« incoming SMPTE code.
MIDI Clock	MIDI Clock and Song Position Pointer. Logic runs as a slave. Clock and SPP can be received at any MIDI input.

Lo**g**ĩc

| Manual | Tempo Interpreter. Manual synchronization or »Human Sync Mode«. Logic runs as a slave to the impulses which the tempo interpreter recognizes as valid beats. The tempo interpreter can be controlled by any MIDI events. |

3

Auto Enable external Sync
When this option is activated, Logic runs as the master (Sync Mode Internal), until it receives a synchronization signal – either in the form of MTC or Clock/SPP or from the tempo interpreter.

Logic then automatically locks to the first received synchronization signal. Please ensure that different synchronization signals don't arrive simultaneously – because as far as time code master is concerned: »There can be only one«.

External Stop ends Record Mode
This option means that during external synchronization, recording stops whenever the time code ceases.

If the option is switched off, LOGIC stops but remains in record mode (Record + Pause).

Frame Rate
This is where you set the frame rate (in »fps«, frames per second). This frame rate applies to both transmitted and received timecode.

24	Film
25	Audio (Europe) and PAL Video
(30 d)	Unusable (not real-time)
30	Audio (USA) and NTSC Video (b/w)
29.97 d	Audio (USA) and NTSC Video (color)
29.97	Extremely rare (not real-time)

»d« stands for »drop frame«. With these formats certain frames are left out according to a regular pattern. To distinguish between them, formats without drop frame are sometimes referred to as »nd« or »non drop«.

Auto Detect Format of MTC
With this option the incoming timecode is analyzed and the correct frame rate is set automatically. In general you should leave this option switched on.

Please note that it is not possible to automatically distinguish between MTC frame rates 29.97 and 30, because;

| 1. | the MTC standard does not allow a distinction, and |

2. a measured rate of 30 fps could also be 29.97 fps timecode running too fast, and vice versa.

Logic automatically interprets frame rates with »approx. 30 fps« as either 29.97 df or 30 nd, depending on whether or not the drop frame format is used. This interpretation will usually be correct, because only these two formats are actually used as standard.

Note »Auto Detect...« only switches to 29.97 df or 30 nd if, previously one of the other conventional formats was set. If you want to synchronize Logic to one of the unconventional frame rates you have to define the format manually. This setting will not be altered by »Auto Detect...«.

Bar Position ... Plays at SMPTE
This is where you set the SMPTE offset for the song. Because songs do not always have to start precisely at bar 1 you can choose any bar position which will be reached at the set SMPTE time.

The preset is 1/1/1/1 at 1:00:00:00. The SMPTE offset 1:00:00:00 is normally used because it allows you to pre-run some timecode.

SMPTE View Offset
If you want to see the time from the start of the song in Logic's time display, rather than the actual SMPTE time, click *Enable Separate SMPTE View Offset*. Then choose *Bar Position* 1/1/1/1 *displayed as SMPTE* 00:00:00:00 (preset).

If necessary, you can set other view offsets here as well.

The Tempo List always shows the real SMPTE time, without the view offset. However, the view offset is used in all other windows.

For each Transport window you can choose individually whether the SMPTE time is shown with or without view offset. In the Transport window (arrow) menu there is also the »Use SMPTE View Offset« option.

Audio
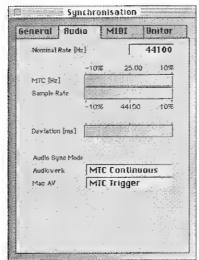This page does not apply to MIDI Sequencer versions of Logic.

Nominal Sample Rate
This is where the selected nominal sample rate is shown.

> You can change the sample rate in the Audio window > Options menu, if your hardware supports several different sample rates.

MTC
This display shows the deviation between the incoming MTC and its nominal frame rate.

3

If the deviation is too large please check that you have set the right frame rate (on the »General« page of the Synchronization window). If in doubt, set the frame rate to 24 fps and switch on »Auto Detect format of MTC«.

Note

Sample Rate

This display shows the deviation of the sample rate from its nominal value.

Deviation

This display shows the current phase deviation of the word clock from the timecode master, i.e. the deviation between audio and Midi.

With varying timecode you can see in this display how Logic Audio regulates the sample rate of the hardware in »MTC continuous« sync mode. Even with large timecode variations, there is no deviation between audio and MIDI.

Small deviations between audio and MIDI are unavoidable, because MIDI can (and should) follow the timecode master directly.

Sync Mode

This is where you define how each individual piece of audio hardware should be synchronized to an external timecode master.

Depending on its construction, not every bit of audio hardware can work in every sync mode described below. This depends particularly on whether or not the hardware's sample rate can be controlled.

MTC Continuous Audio regions are started in sync and the sample rate is continuously regulated according to the variations in the timecode master.
With this method even very long audio regions stay in sync.

MTC Trigger Audio regions are started in sync, but are then played with a constant sample rate, regardless of any variations in the timecode master.
Logic Audio always uses the set nominal sample rate (44.1 or 48 kHz)

This mode is suitable when it is vital to retain the absolute pitch of a recording. If the speed of the timecode master deviates from the nominal value, you have to split long regions into shorter sections.

MTC Trigger / Speed Detection
Similar to »MTC Trigger«, but in addition the Speed Detection constantly monitors the speed of the timecode master while Logic is running. The next time you start Logic, it uses a sample rate which precisely matches this measured speed (i.e. it uses a sample rate which deviates from the nominal sample rate by the same amount as the speed of the timecode master deviates from the nominal frame rate.)

This mode keeps long regions in better sync with the timecode master, although not as closely as »MTC Continuous«. However, it does use a constant sample rate, which is not affected by variations in the timecode master.

External/Free Logic Audio has no influence on the sample rate. The audio hardware has to ensure that the position and sample rate of the audio regions match.
This sync mode is only advisable if you can be sure that the word clock and timecode master are running in sync, for example by using an external SMPTE/wordclock synchronizer.

Digital Similar to »External/Free«, but in addition the hardware is set up so that it synchronizes to the sample rate of the incoming digital signal (with DAE hardware you have to make this setting in the DAE Hardware Setup).
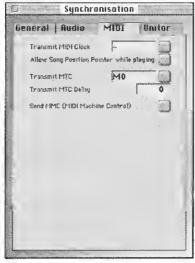
SMPTE Slave Driver

Exactly the same as »Digital«, but in addition a SMPTE slave driver is set to the same sample and frame rates as in Logic.

The SMPTE slave driver is a device for synchronizing ProTools hardware to timecode or word clock.

MIDI

This page is where you monitor all the settings sent by Logic via Midi when the sequencer is running. This enables you to synchronize external devices as slaves to Logic, which acts as the master.

Transmit MIDI Clock

The switch on the right activates transmission of Midi Clock. In the display next to it you can choose the port from which Midi Clock is sent.

Every time you start, »Song Position Pointer« (SPP) is also sent.

Because not all devices can process SPP the real-time message »Continue« is also sent. The exception to this is when you start at position 1/1/1/1. In this case, the real-time message »Start« is sent instead of »Continue«.

Allow Song Position Pointer while playing

According to the Midi Standard, Song Position Pointer is normally only sent when you start. This option means that SPP can also be sent while the sequencer is running.

The advantage is that external devices can also follow Logic in Cycle mode.

If the external devices cannot process SPP, you should switch off this option. This improves the timing when cycling.

Midi Clock to all Ports
Both Midi Clock and MTC can be sent to all ports simultaneously: choose »÷«.

Although it is possible to transmit Midi Clock via a bus along with normal Midi events (such as notes or controllers) it is best to send MTC (which is very data-intensive) via a Midi bus which is not otherwise being used.

It is very inadvisable to send MTC via all ports!

Transmit MTC
The switch on the right activates transmission of Midi Time Code. In the display next to it you can define the port via which MTC is transmitted.

Transmit MTC Delay
This parameter allows you to delay the transmitted Midi Time Code. Negative values mean that the MTC is transmitted earlier. This enables you to compensate for any reaction times in the external MTC slaves.

Send MMC (MIDI Machine Control)
This is where you can switch on transmission of Midi Machine Control. These commands are then always sent whenever you operate Logic's transport functions (Start, Stop, Rewind, etc.).

MMC is normally used when Logic is running as a slave to an external master (e.g. ADAT) but you want to control the external master's transport functions from within Logic.

Logic therefore acts as MMC master and MTC slave simultaneously.
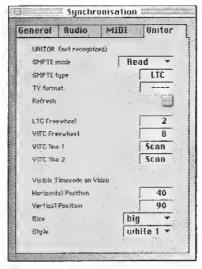
Note   If you want to use the external master's transport functions you don't need MMC! In this case Logic as the slave will follow the MTC master.

You can also use MMC to put tracks in the MMC slave into record-enable status. For details please refer to the »Midi Machine Control« section of the »Tempo and Synchronization« chapter in the Logic manual.

Unitor

This page is where you set the major synchronization parameters for Unitor8.

Remember that you can fully edit Unitor8 via the »Unitor8 Control« software supplied.

SMPTE Mode

Here you can instruct Unitor8 to write SMPTE. You must switch from *Read* to *Generate*, and set the frame rate and start-time in the »General« page.

SMPTE Type

This is where you define what SMPTE format you want to use:

LTC	Longitudinal Time Code is written onto a tape track.
VITC	Vertical Interval Time Code is written invisibly into a video signal.

TV Format

Please state here which video format you are using:

PAL	The video format used in Europe. If you are working with video in SECAM Norm, please also choose PAL here.
NTSC	The video format used in the USA .

You don't just need this setting when writing and reading VITC. If you are operating LTC and you want to generate a video picture with mixed-in SMPTE time, you have to choose the correct format here.

Refresh

In Refresh mode a new timecode is generated in sync with the received timecode. »Refresh« works with both VITC and LTC.

Note   You should always use »Refresh« whenever you have to copy an LTC track, because you cannot directly copy LTC without a considerable loss of quality. When copying whole multitrack tapes you should patch all the tracks directly, but refresh the TC track via Unitor8.

You should only switch on Refresh mode if you really need it.

LTC Freewheel, VITC Freewheel

Here you can set the freewheeling time in frames for LTC and VITC individually.

The freewheeling parameter affects the SMPTE reader and specifies how long the synchronizer carries on transferring MTC to the sequencer after timecode ceases to be read.

Long freewheeling times can sustain synchronization even if there are drop outs in timecode but they also increase Logic's reaction-time to stopping the timecode master. In practice you should set the value as large as necessary (for sustained operation) and as small as possible (for low waiting times).

VITC Line 1, VITC Line 2

VITC is written into two lines of the video picture which are normally invisible. The lines should not be consecutive and are usually situated between 12 and 20.

In the »Scan« setting the VITC lines are automatically recognized. You should only enter the lines manually in problem cases.

Visible Timecode on Video

Here you can set the position, size and color of the timecode display which is mixed with the video picture.

Loɡɪc

Preferences

SMPTE Display with Milliseconds

The »Display SMPTE with Milliseconds« option [Preferences > Display Options] allows you to show the frame fractions in milliseconds instead of SMPTE bits (also called »subframes«).

Don't forget this value depends on the frame rate: at 25 fps a frame is 40 ms long, at 30 fps approx. 33 ms.

3

Changes

The **Preferences > Audio > Use Sample Rate from Tape-Calibration in Sync** option has been removed. Instead you can now choose the word clock source in the new Synchronization window.

In previous versions you could open the **Options > Calibrate to External MTC/SMPTE** dialog box in the Audio window but this is no longer required. Logic now constantly calibrates itself to the speed of the incoming timecode and uses the value obtained the next time you start playback.

New songs have a preset SMPTE offset of one hour (1:00:00:00). This is the standard start-point for the first song on the first tape of a project – subsequent tapes usually start at consecutive hours.

The SysEx message »Enable Fostex R8 Synchronizer Sync Mode« is no longer sent automatically whenever you start Logic. Fostex R8 users have to transmit this SysEx message manually, if necessary. The message is:

Hex   F0, 51, 7F, 15, 38, 74 (and EOX, which Logic transmits automatically)

Decimal   Sysex (240), 81, 127, 21, 56, 116.

3.3   New Features in Version 2.6

New Phase Control Timer Model

This new timer model can even beat LOGIC's previously outstanding timing. The number of possible audio tracks when using the Emagic

Audio driver has been increased, and the screen redrawing has been accelerated. Conflict between different computer models has also been avoided.

To activate this high-performance timer choose **Preferences > Compatibility > New Phase Control Timer Model**.

If you are using the new timer model during external synchronization, the real measured frame rate is shown in the Transport window beneath the Tempo display.

Note   On 68k computers compatibility with MidiShare is no longer offered from LOGIC 2.6 onwards. The last compatible LOGIC version is therefore 2.5.4.

The "timer" is LOGIC's internal time basis.

Chapter 4
Audio Functions

4.1   Real-Time Effects

4

You can now get CPU-based real-time effects with any audio hardware that can be addressed via Emagic's own audio drivers. This is applicable to:

* AV (Apple SoundManager)

* Audiowerk8

• Korg 1212 I/O card

With DAE, TDM, Akai DR 8 / DR 16 or Soundscape hardware only the DSP-based real-time effects are available.

> "DSP-based" means that these effects are calculated using digital signal processors on insert cards (or in the external audio hardware). "CPU-based" means that these effects are calculated in the computer's processor. These two methods are also known as "host-based" or "Native Signal Processing".

Memory Allocation

Individual real-time effects need from 10 to 400 kB of memory. Please **Important!** make sure you have enough *free* memory available. Unlike older versions (!) it is no longer advisable to allocate Logic Audio very much memory. You are advised to leave the preset memory allocation unaltered. The memory requirement for all real-time effects used is shown in the overview (Apple menu > About This Macintosh) under »System«.
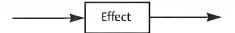
Introduction

Here are a few basics about signal flow in mixing desks. If you are already knowledgeable in this area, then go directly to Abschnitt *Overview of the Real-Time Effects* auf Seite 4 - 45.

In practice there are two ways of sending audio to effects: via an insert or via a bus (also known as »aux path«).
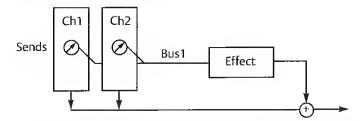
Insert Effects

With insert effects the whole signal is processed. This means that 100% of the signal flows through the effect. This is suitable for equalizers or dynamic effects. In theory this also applies to pan pots and faders.

Bus Effects

In this case a controlled amount of the signals is sent to the effect. The classic example is reverb, where the most important effect parameter is the amount sent, as this determines where the signal source appears to be placed in the listener's audio field. Echo (delay) and the modulation effects (chorus, flanger ...) are also normally used in this way.

With Logic Audio, the effect is positioned in the insert of a bus object. The signals of the individual tracks can each be sent to the bus via a send-pot. The audio signal is then treated with the effect and mixed with the stereo output.

The advantage being, that this kind of effect only requires one set of processing, since the signals from several tracks can be processed simultaneously.
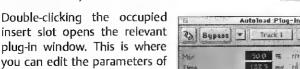
Note   With computation-intensive effects like reverb, it is always advisable to feed them via a bus. Chorus, flanger and delay should also always be fed via a bus if they are going to be used on more than one track.

Transversley, in some cases it may make sense to patch an effect such as a delay directly into the insert of an individual track. This way there are no restrictions in Logic as to where real-time effects may be used.

Logic
A | U | D | T | O

Overview of the Real-Time Effects

You can add all the real-time effects by means of a long click on an insert slot (see also Abschnitt *Inserts* auf Seite 4 - 54).

Double-clicking the occupied insert slot opens the relevant plug-in window. This is where you can edit the parameters of the real-time effects.

No effect	
HQParEQ	(m/m)
HQSweepEQ	(m/m)
LowPass	(m/m)
HighPass	(m/m)
ParEQ	(m/m)
LoShelv	(m/m)
HiShelv	(m/m)
Reverb	(m/m)
Delay	(m/m)
Flanger	(m/m)
Chorus	(m/m)
Reverb	(m/s)
Chorus	(m/s)

General Parameters

If you ⌥-click any parameter this resets it to a neutral value.

Mix

»Mix« defines the proportional mix of the original (dry) and effected (wet) signals.

If the effect is being fed via a bus, it nearly always makes sense to set the mix proportion to 100% (=default for inserts in bus objects). Only then can the send pot in the channel path achieve the entire possible range.

Region Gate

»Region Gate« lets you define when the calculation of the effect should cease after the end of the last region. This saves processing power if the effect is not required for long passages in the Arrange window. During these passages the processing power saved could be made available for another effect.

You can also use the Region Gate parameter as an effect parameter in and of itself, for creating gated reverb or gated delays.

Equalizer

An equalizer (EQ) is used to boost or cut specific frequency ranges.

HQParEQ
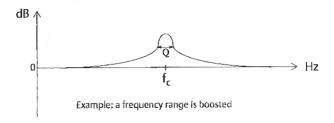
The fully-parametric equalizer »HQParEQ« has the following three parameters:

Hz	Center frequency
dB	Cut/Boost
Q	Quality

Thus a symmetrical frequency range on either side of the center frequency is boosted or cut. You can adjust the width of this frequency range with the Q factor.

Example: a frequency range is boosted

Bear in mind that the »HQParEQ« offers very high sound quality but therefore requires more processing power than any other EQ algorithm.

HQSweepEQ
Unlike the fully parametric EQ, the »HQSweepEQ« has no adjustable quality function or (Q), and doesn't require as much processing power.
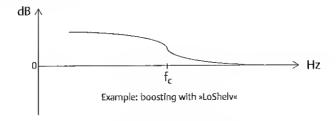
The »HQSweepEQ« also offers high sound quality and thus is still a CPU demanding algorithm.

ParEQ
The »ParEQ« has the same parameters as the »HQParEQ«, but uses a much simpler algorithm which requires far less processing.

LoShelv
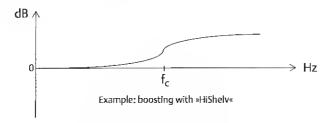The »LoShelv« equalizer only affects the frequency range below the chosen frequency.

Example: boosting with »LoShelv«

The low shelving equalizer allows you to boost or cut the bass range.

HiShelv

The »HiShelv« equalizer affects only the frequency range above the chosen frequency.

Example: boosting with »HiShelv«
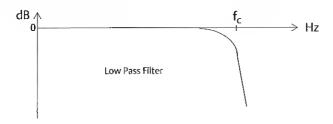
The high shelving equalizer allows you to boost or cut the treble range.

Filter

LowPass

The »LowPass« filter affects the frequency range above the chosen frequency; lower frequencies pass through the filter.
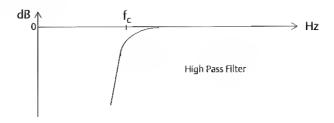

Low Pass Filter

You can use the low pass filter to completely get rid of the treble range above a selectable frequency.

HighPass

The »HighPass« filter affects the frequency range below the set frequency; higher frequencies pass through the filter.

You can use the high pass filter to completely get rid of the bass range below a selectable frequency.

High Pass Filter

Delay

The delay, as the name suggests, delays the audio signal or simply creates reflections of that original signal.

Time

The »Time« parameter defines the delay time in milliseconds.

Very small values (up to 10 ms) produce comb-filtering, larger values (10 to 100ms) produce doubling-effects, and even greater values gives rise to echos.

Feedback

With »Feedback« the delayed signal is routed back to the input, which allows you to control the number of repeats or reflections.

Flanger

Flanging is produced by modulatedcomb-filtering.

Offset

The »Offset« of the flanger defines the normal value of the delay time, which is then modulated by the »Speed« and »Width« parameters. If »Width« is set to nil, you can use the offset to produce manual flanging.

Width

The modulation amplitude or width. This defines the frequency range in which the comb-filter is modulated.

Speed

The frequency or speed of the modulation. This determines how quickly the comb-filter is modulated.

Feedback

With »Feedback« the delayed signal is routed back into the input. Negative values mean that the phase of the routed signal is inverted.

You can use »Feedback« to increase the intensity of the flanger which can produce very dramatic effects.

Chorus

The Chorus effect can be used to make a signal »wider«, particularly the variety with stereo output (m/s).

Width

The modulation width of the chorus effect.

Speed

The modulating frequency of the chorus effect.

Feedback

With »Feedback« the delayed signal is routed back to the input, which increases the intensity of the chorus effect. High values can produce an unnatural sound.

4

Reverb

Reverbs require far more processing than other real-time effects, especially with high quality values.

Roomsize

The »Roomsize« parameter defines the size of the simulated room. Small rooms have denser reflections, less air damping of the soundwaves between the reflections off the walls and therefore a variable phase relation.

Decay

The time taken for the reverb to die away. Don't forget that the absolute reverb time (RT_{60}) can be adjusted independently of the »Roomsize« parameter.

Density

The density of the reverb. High values lead to a reverb that is more dense, which depending on the sound material may sound better, but less natural.

With room simulation the »Density« determines the geometry of the virtual reflective surfaces.

High Frequency Damp

This parameter controls the high-frequency dampening of the reverb's decay phase. In natural rooms the reverb time always depends on the frequency: high frequencies decay quicker than low frequencies.

With room simulation »HighFreqDamp« determines the material characteristics of the surfaces: from metal (low values) through wood (medium values) to carpet and curtains (high values).

PreDelay

The »PreDelay« parameter defines the pre-delay before the reverb occurs.

With the right level of pre-delay the reverb gains space. The ideal values are normally between 5 and 50 ms. Very small values sound better in solo mode but in the mix can lead to »mushing« of the signal with its reverb. Larger values can be interesting for combined delay/reverb effects, but in nature this would only occur if the sound source was outside a tunnel opening.

Quality

The »Quality« parameter allows you to choose between different algorithms which create the reverb. The algorithms vary greatly in terms of processing requirements and sound quality.

Note If you find that you don't have enough processing capacity, try reducing the quality of the reverb.

Functions of the Plug-In Window

Every Plug-In window has a row of switches at the top whose functions are the same in all Plug-Ins.

Link

 If the Link button is switched off (preset) you can open several Plug-In windows simultaneously.

If the Link button is switched on this Plug-In window is used to display all double-clicked Plug-Ins.

Bypass

 The bypass switch takes the whole effect out of the signal flow. The effect's input signal is routed directly to the output unaltered.

Arrow

The arrow menu is used to organize the effects programs; see
Abschnitt *Organizing Effects Programs* auf Seite 4 - 51.

Choosing an Audio Object

If you have used the displayed effect algorithm in another audio object,
for example in another track, you can simply swap between the tracks.
For example, you can quickly compare settings or copy effects pro-
grams.

Insert Slot Selection

If you have installed more Plug-Ins in other insert slots of the same
audio object, you can quickly change to the other Plug-Ins. This allows
you to quickly balance the settings of all the Plug-Ins within a channel.

Organizing Effects Programs

All Plug-In settings are stored within the song file and are automatically
recalled the next time you load that song.

You can also use Plug-In Setups to help organize Plug-In parameters.
The result is similar to the storage locations in an external effects unit,
combined with a clipboard for effects parameters.

You can use the arrow at the top of the Plug-In window to open a flip
menu with the following functions:

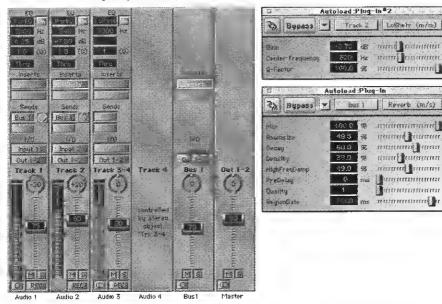|	
Capy Setup	copies all parameters onto its own »private« clip-board. They remain here until the next time you choose *Copy Setup*. This does not affect the global LOGIC clipboard.
Paste Setup	If you have opened a Plug-In of the same type, you can add the parameter set from the »private« clip-board. This allows you to quickly set up several Plug-Ins of the same type or exchange effects settings be-tween songs.
Save Setup	This allows you to save all the Plug-In parameters onto disk. This is useful if you have created a special sound effect which you want to have available for fu-ture use.
Laad Setup	For loading stored parameter sets from disk. The file selector box shows only setups for compatible Plug-In types. It can also read the Digidesign format for TDM Plug-In settings.

Note Remember that that each real-time effect has its own set of parameters, and therefore its own file format. In particular, mono effects have a different data format from stereo effects.

4.2 Specimen Mixing Desk

The specimen mixing desk below mixes two mono tracks (tracks 1 and 2) and a stereo track (track 3-4). Each of the first two tracks has a parametric EQ installed. Track 2 contains a further EQ band (low shelving) as an insert effect. Track 3-4 is processed by a lowpass filter.

In all tracks the sends are installed on bus1. A real-time effect (reverb) is installed in the bus1 object.

All tracks are routed to the output pair 1-2. There is also an output 1-2 object (»Master«).

The EQs and the filter are processing 100% of their respective track signals. The send pots can each send an adjustable portion of the track signal to bus 1.

The whole of bus 1 is then processed with a reverb in the bus 1 object. The effect signal is blended with the stereo mix via the bus 1 object's fader.

The complete stereo mix can then be controlled with the Output 1-2 audio object on the right.

If this particular signal flow specimen makes sense, then understanding and managing your own signal flow needs should be unobtrusive.

4.3 Audio Objects

4

The appearance of the audio objects has been graphically overhauled. When you open a song done in a previous version of Logic Audio, you may have to adjust the size of the audio objects to make room for the new look. Newly-created audio objects automatically appear in the new graphical format.

Object Parameters

For a guide to the general parameters please refer to the *Object Parameter Box* section of the LOGIC Audio manual.

Cha

The channel parameter now has some new available settings:

Bus

This setting turns the audio object into a bus. You can then send portions of the signals from several tracks (*Track* objects) via the send controls to this bus, and then process this submix with a real-time effect in the insert of the bus object.

If your hardware has several individual outputs, e.g. Audiowork8, the bus object can act as a master send for an external effects unit. Choose an individual output as the output for the bus object and then connect it to the input of the external effects unit.

off
Track 1
Track 2
Track 3
Track 4
⋮
Input 1
Input 2
Input 3
Input 4
⋮
Aux 1
Aux 2
Output 1
Output 2
Output 3
Output 4
⋮
Bus 1
Bus 2
Bus 3
Bus 4
⋮
Track 1-2
Track 3-4
⋮
Input 1-2
Input 3-4
Input 5-6
Input 7-8
Aux 1-2
Output 1-2
Output 3-4
Output 5-6
Output 7-8
Bus 1-2
Bus 3-4
⋮

Operating Controls

EQ

A long click on the »Thru« button allows you to choose a new equalizer band or a filter. The parameters of the new EQ are then displayed. You can add up to 4 EQs or filters.

EQs can also be added as insert effects, if you don't want to make the audio objects too long or if you want to use more than 4 EQs/filters per track.

For details on the various types of EQ please refer to Abschnitt *Equalizer* auf Seite 4 - 45.

Sends (Aux Sends)

Simply click in the empty space under "Sends" and choose a bus where you want to send the signal. A pot appears on the right which you can use to control the send level. As you are adjusting the level, the relevant value appears in the small menu box to the left of the pot.

The send can be automated too. The first send responds to Controller #28, the second send to Controller #29, etc.

Inserts

If you have enough processing capacity you can have up to 8 inserts per audio object.

In mono objects, as well as mono effects (m/m) you can also connect effects which have a mono input but a stereo output (m/s). If you add one of these effects, then from this insert point onwards you can only insert effects with stereo inputs (s/s). Don't forget that in general, stereo effects require twice as much processing power. With stereo signals, the pan pot turns into a balance control and the solo level shows both channels.

Only effects with stereo inputs and stereo outputs are available for stereo objects.

Bypass

You can switch inserts into bypass mode by ⌥-clicking their name.

The name of an active effect is shown in flashing green, the name of a deactivated effect (bypass mode) does not flash.

Logic

Automation

For basic information on the automation please refer to the *Automation* section in the LOGIC Audio manual.

> The automation of the Plug-In parameters works the same as volume and panning, or as the Plug-Ins in TDM systems. All of the parameters that are recorded in normal sequences as controller events. This means that you can use all the usual edit options in Logic's trusty Editors for automation data as well.

The operating controls (parameters) in the first four insert effects of each audio object can be automated. The first 16 parameters in each insert effect can be remote-controlled.

The allocation of Controller numbers to the insert effects parameters is shown in the table below. The numbering of the inserts begins at the top.

1. Insert	Effect parameter	Controller # 64 to # 79.
	Bypass	Controller # 56
2. Insert	Effect parameter	Controller # 80 to # 95.
	Bypass	Controller # 57
3. Insert	Effect parameter	Controller # 96 to #111.
	Bypass	Controller # 58
4. Insert	Effect parameter	Controller #112 to #127.
	Bypass	Controller # 59

Dynamic Controller Allocation

To allow more than 16 parameters to be automated in future Plug-Ins (or TDM Plug-Ins, etc.), LOGIC Audio organizes the number of required Controllers dynamically.

The "basis addresses" (Controller numbers: 64, 80, 96, 112) are unaffected. However, if you have only switched on one Plug-In in the first position (top insert slot), you can automate 64 parameters: 64-127.

If you add another Plug-In to the second slot, Controllers:

- 64-79 (16 parameters) are used for the first Plug-In, and

- 80-127 (48 parameters) are used for the second.

If you use one Plug-In in the first slot and a second Plug-In in the third slot, you can automate 32 parameters in each (via Controllers 64-95 and 96-127).

If you want to see which Controller number controls which parameter in which Plug-In, just open the Event List and click the Controller number. You will see a list of all automated parameters in the flip menu. The parameter names of all the known Plug-Ins are shown as text in the Event List.

Operating the Automation

The automation of the Plug-In parameters works in exactly the same way as the usual automation already described in the regular manual.

Try it for yourself. Begin by recording the *A-playback* instrument, open a Plug-In for the track and move the control which you want to automate. These movements will be recorded as MIDI commands which can then be played and edited.
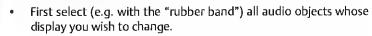
Tip

This method can be used as a "learning process" to establish Controller numbers, which can also be automated via graphical means in Hyperdraw. With the Hyperdraw *Auta Define* function, Hyperdraw automatically switches to the first Controller used.

You can even automate the Plug-Ins in objects like "Input", "Aux", "Output" or "Bus". To do this, create a channel splitter in the Environment (**New > Channel Splitter**) and connect its channels via cables with the relevant audio objects. Add the channel splitter to the Arrange window like a track instrument, as you did previously with an *A-playback* instrument.

Display

If you want to reduce the length of a channel you can hide individual components such as the inserts or the I/O routing. Remember that you are not actually switching the functions off; you are just changing the display of the audio object.

- First select (e.g. with the "rubber band") all audio objects whose display you wish to change.

- In the parameter box you can then switch off the following options:
  - Show EQs
  - Show Inserts

- Show Sends
- Show I/O

Bear in mind, that some types of objects (e.g. outputs o r busses) do not have all of these components. Their size is adapted to fit the track objects.
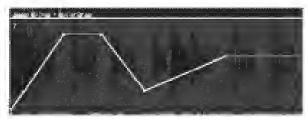
You can construct your own audio mixing desk in different layers with various display options. Thus, you can adapt the mixing desks to fit within your screensets.

Tip

4

4.4   Audio in the Arrange Window

HyperDraw for Regions

HyperDraw™ can also be used directly on audio regions, for example to draw changes in volume and panning.

Choose **Options > HyperDraw > ...** or use the HyperDraw key commands. If you are not yet familiar with HyperDraw please refer to the »HyperDraw« section in »The Arrange Window« chapter of the Logic Audio manual.

If you want to use HyperDraw on stereo regions, you should always use the left (top) region. Logic Audio automatically uses this information for both sides.

Note

When you use HyperDraw on audio regions, MIDI events are created which are always organized together with the audio region. You can also edit these MIDI events in the Event List or Hyper Editor.

Audio Cycle Recording

You can make audio recordings even when »Cycle« is switched on. A new track is created for every cycle. All the tracks created are still played via the same audio object. This prevents the tracks being played simultaneously.

> If you stop recording just after the end of a full cycle, no region is created for the new cycle which has just begun. However, the audio material is not lost but is recorded after the last region in the audio file.

> The whole recording (during all cycles) is stored in a single audio file. This audio file is split into regions which are as long as the length of the cycle. The region for the previous cycle is automatically muted at the beginning of the next cycle.

Audio Cycle Recording also works when you are simultaneously recording two channels (e.g. stereo tracks).

Punch on the Fly

You can do punch recording with Logic Audio3.0, just like on analog tape machines, the only difference being that there is no gap or seam in the audio produced by a physical punch out.

> Punch or drop recording is when you »punch in« to a previously recorded passage while the tape is running in order to replace an error with a correct recording, and then »punch out « of the recording again once the mistake has been corrected.

If you click-hold the Record button in the Transport window the Record menu opens where you can switch on »Punch on the Fly«.

> On hard disk recorders this function is not self-explanatory and is technically involved, due to the unavoidable delay in switching between reading and writing (creating a file etc...). In practice, recording takes place constantly. Afterwards, Logic then adds the result of this automatic background recording to the exact place where you wanted the recording to occur.

> A free track therefore has to be available for this purpose. A track is »free« if there are no regions (or only muted regions) on it after the SPL or within the cycle.

If you attempt a »Punch on the Fly« recording and Logic Audio produces an error message, please do not temporarily mute any audio tracks which are not required.

Auto Input Monitoring

Until now this feature was only available on TDM systems.

Input monitoring allows you to determine which signal you listen to on record-enable tracks. If Auto Input Monitoring is switched on, you only hear the input signal during the actual recording – before and afterwards you hear the old track signal while the sequencer is running. This helps you judge drop-in and drop-out points for punch recording. If Auto Input Monitoring is switched off, you will always hear the input signal.

Switching Auto Input Monitoring on/off

If you click-hold the Record button (Transport window) the Record menu opens. This is where you can toggle the input monitoring.

The table below shows what you hear at the output of record-enable tracks:

	Playback		Record
	Logic stopped	Logic running	
Auto Input Monitoring switched on	Input signal	Old track signal	Input signal
Auto Input Monitoring switched off	Input signal		

Possible Problems with Input Monitoring

Typical problems that can arise with record-enable tracks:

- Singers cannot hear themselves while Logic is running. All they can hear is the old recording.

    - Switch off Auto Input Monitoring.

- I cannot hear the track even though I am not yet recording!

    - Switch on Auto Input Monitoring.

Depending on the situation both options can be useful. Normally Auto Input Monitoring is switched on and is only switched off in exceptional situations.

Whenever you are doing punch recording (e.g. Punch on the Fly), you should switch on Auto Input Monitoring.

Note   When recording, always make sure you don't monitor the microphone signal directly but via the output of the Logic track. This normally requires a recording desk with busses. Then Auto Input Monitoring will ensure that during punch recording the sound, volume and mix of external effects remain the same.

Record Enable Switches

You can switch the audio tracks into record-enable from the Arrangement. You can produce a column containing Record Enable switches by choosing **View > Record Audio Switch**. These switches are marked with an »R« and show the status of the Record Enable switches in the audio objects.

> If you can't see these switches you need to activate the drivers for the relevant audio hardware in the Audio Preferences (**File > Preferences > Audio Extensions**) and restart Logic.

Other Functions

If you require individual regions so that you can select individual sections, simply choose **Functions > Convert Regions to Individual Regions**.

If you require individual audio files so that you can perform specific destructive sample editing, please choose **Functions > Convert Regions to Individual Audio Files**.

Improvements

The command **Functions > Sequence Instrument Parameters > Turn Loops to Real Copies** now affects the loops in audio regions. However, the arrange objects which are created represent the same region. Thus any alterations in the length of the region or audio material affects all of the objects.

In the Arrangement, when merging audio regions whose name already ends in »...merged« a serial number is now added to the name.

Several other details for specific situations have been improved.
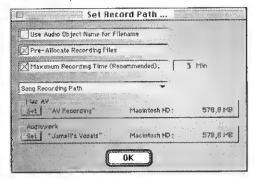
Logic
A|U|D|I|O

4.5   Audio Window

Set Record Path

The path (folder) for audio recordings can now be set individually for each song. You can also have different paths for different audio hardware systems running simultaneously.

To call up the dialog window for these settings, open the Audio window and choose **File > Set Record Path...** or open the Record menu (click-hold the Record button):

4

Use Audio Object Name for File Name
If this option is switched on, the name of the audio object is used as the file name for the recording.

Pre-**Allocate** Recording Files
If this option is switched on, Logic Audio creates the audio file for the next recording after you activate record-enable for the track. In addition, at the end of every recording the audio file for the next recording is created immediately. This allows you to start audio recordings quicker.

Unused recording files are deleted when you quit Logic Audio.

Maximum Recording Time (Recommended): xxx Minutes
This parameter used to be available in its own dialog box (Audio window: **File > Size Record File**).

In Logic Audio 3.0, you can switch this option off. In this case a record file as big as the whole free memory from within the medium will be created.

Disadvantages:

*   the audio file can be heavily fragmented,
*   if you are using DAE hardware there may be no space left for the Overview file. The Overview will then have to be calculated after the recording.

It is strongly recommended that you switch on this option and set a top limit for the recording time.

If there is not even enough storage space available , the maximum length of the recording is temporarily reduced. During the recording you can see how much time is available in the Record Float window (with the red bar).

Global Record Path / Song Record Path

The Global Record Path was available in earlier versions. It is stored in the Preferences and applies to all songs. The advantage is that you don't have to define a record path in every new song before you can record, providing you don't mind recording in the same folder.

The Song Record Path allows you to organize the audio recordings for all songs in a single folder. The advantage here, is that when you change between different songs, any new recordings are automatically stored in the relevant folder, without having to switch the path manually.

Set

These buttons can be used to define the path for each separate hardware system. You can create a new folder (if required) in the dialog box.
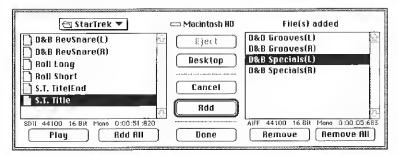
To the right, you will see the current volume and the remaining capacity (only if the volume is registered).

Tip If you click-hold the volume the entire path is displayed. This way you can see exactly which folder is being recorded into.

Adding Audio Files

New File Selector

Logic Audio 3.0 has a special file selector box for adding audio files with the following features:

- Adding several files at once.

- Adding or removing all files in the folder.

- The cursor stays at the last position after you have added a file -- subsequent files can therefore be added by pressing »Enter« or »Return«.

- Any files which have already been added are filtered out.

- Auditioning audio files:

  - Channel 1 of the audio hardware (Dev) set in the Audio window is used for playback.
  - playback can be stopped at any time.
  - Playback is not stopped if you change the folder or volume.
  - A short standby phase (a delay before the file can be auditioned) ensures that you can scroll quickly through directories.

»Done« means all selected audio files have been added to the song.

Add Audio Files from CD

If files have been added from CD or some other protected volume Logic Audio now asks you for a path so it can copy these files onto the hard disk.

Search Audio File

If LOGIC cannot find an audio file in the expected place and you look for the file »manually«, a new file selector box now appears showing the names of the audio files which you are looking for.

The automatic search function for audio files has been greatly accelerated (100-fold). If it finds more than one file with a matching name a dialog box appears where you can select the correct file.

Logic Audio now searches all registered volumes.

Stereo Files

Disconnect Stereo Files

Both sides of a stereo audio file are normally edited together. However, sometimes you may wish to edit one side individually. This is now possible:

• Select the stereo file

• Choose **Edit > Disconnect Stereo File**

You can now edit both sides of the recording as individual mono files.

Note   This function will only disconnect one stereo file at a time. If you want to reconnect the files, don't define any new regions.

Reconnect Stereo Files

The **Edit > Reconnect Stereo Files** command reconnects all disconnected stereo files in the song. Only files that were previously stereo are reconnected. They must have the same number of regions.

AIFF Stereo

Split stereo files can now be converted into an interleaved stereo file in the AIFF format using the **File > Convert to AIFF Stereo** command.

Convert All

When you add stereo files they have to be converted into the split stereo format. If you want to add several stereo files in the file selector box, Logic Audio now asks whether all the files should be converted at once (»Convert All«).

Audio Configuration Window

The **View** menu allows you to view only those elements which are of interest.

If you want to remove elements from the configuration you can do so via the new **Edit > Remove** option.

4.6   Sample Editor

4

Plug-Ins

The Macintosh version of Logic Audio 3.0 now supports Plug-Ins in the »Premiere« (Adobe) and »Audio Suite« (Digidesign) formats.

All of these Plug-Ins allow destructive editing of the selected audio material in the Sample Editor. There are new menus with the names of the Plug-In formats. You can access all installed Plug-Ins of the appropriate standard.

When you call up a Plug-In, Logic provides an Undo option. Don't forget that there are also backup functions for audio files available in the Sample Editor.

Otherwise the Plug-Ins work exactly the same as the other functions in the Sample Editor, such as the DSP effects in the Digital Factory.

Premiere Plug-Ins
Logic Audio searches in three places for a folder called »Premiere Plug-Ins«:

*   In the same folder from which Logic Audio was started

*   In the main directory of the volume from which the System was started

*   In the active System folder

    There is one more option: create an alias from the folder containing your Premiere Plug-Ins. Put this folder in one of the three places listed above. The alias should be called »Premiere Plug-Ins«; you can rename the original folder anything you want.

    This approach means that you can leave the configuration unaltered for another program, but you only have to keep one copy of the Premiere Plug-Ins on your hard disk.

When you start Logic Audio it searches in this folder for valid Premiere Plug-Ins. The Plug-Ins can be organized within the folder or in other folders.

Installing Premiere Plug-Ins at runtime

If **Premiere > No Plug-Ins** is selected in the Sample Editor, you can use a file selector box to localize the folder with the Premiere Plug-Ins. An alias of this folder is created in the Logic folder so that the next time you start the program it can be found automatically.

Preview

Most Plug-Ins have a Preview button so you can audition the edit.

You can set the duration of the preview range in the **Premiere > Preferences** dialog window. Bear in mind that you need enough available RAM. With some Plug-Ins, parameter changes are not carried out until the next time you play the preview range. In these cases it is advisable not to make the range too big.

Note   For technical reasons (Premiere Standard) Premiere Plug-Ins are always previewed via the SoundManager.

Audio Suite Plug-Ins

Audio Suite is only available for owners of DAE hardware. You must use DAE Version 3.1 or higher.

The DAE searches for Plug-Ins in the DAE folder (located in the System folder).

Ask your Digidesign dealer (or the Digidesign representative company in your country) for Audio Suite Plug-Ins. Together with these Plug-Ins you will also get a description of how they are installed.

4.7   Improvements

Starting Logic Audio without Audio Extensions

If you hold down the ⌃ctrl key when you start LOGIC Audio, a dialog box appears where you can switch off individual drivers or all audio drivers for this particular start-up (this has been possible for DAE since Version 2.6).

You can start Logic Audio quicker without Audio drivers, for example if you want to use just the MIDI sequencer.

Preview in TimeMachine II

The Prelisten function in the TimeMachine II also functions with Audiowerk8 and Digidesign's AudioMedia III.

Audio Recording on every Track

Every track object now has a Record Enable switch.

If your hardware has two inputs (AV, AW8, AMIII) odd-numbered tracks are recorded via the left input, even-numbered tracks via the right input.

With extended TDM systems you can record on all 32 or 48 audio tracks. In TDM systems there are now 32 audio busses instead of the previous 16.

If you are using different audio hardware systems you can record on all hardware simultaneously.

Level Meter

The recording level meter has been improved. Even if the processing capacity is not sufficient for a smooth display, it reliably shows the last maximum level.

2 GB Limit removed

The file size of each audio file is no longer limited to »2 GB divided by the number of audio tracks«.

Phase Control Timer for CBX

The New Phase Control Timer Model can now be used with a CBX-D3 or D5 (selectable via **Preferences > Compatibility**). One of the advantages is that screen redrawing is accelerated. For more information on the Timer Model please refer to the Synchronization chapter in the manual.

Recording after Pause Mode

You can start audio recording via »Record Toggle«, »Pause« or »Play« even if Logic Audio was in Pause mode. Recording then begins exactly from the current position.

Record Repeat

This function now also works with audio recordings, just like MIDI recordings.

Changes

The **Preferences > Audio > Audio Object with dB scale as default** option has been removed due to the introduction of the new audio objects.

In the Audio window you used to be able to open the **File > Size Record File** dialog box, but these functions are now contained in the Record Path dialog box (see above).

With a new song the first input pair (1/2) are preset on all tracks.

4.8 New Features in Version 2.6

Instructions for the Time Machine II were supplied with Update 2.6.

Remove DC Offset

The Sample Editor has the new edit Functions > Remove DC Offset. This removes the DC offset from audio files, which can arise when recording on badly constructed or damaged audio hardware.

You can spot DC offset if the waveform is centered above or below the axis and when you play the regions in the Arrange WIndow, you can hear crackles at the beginning and at the end of the recording.

Solo

All audio objects have a solo button. This mutes all other objects ("Solo In Place"). The muted objects are marked with a flashing "M" in the mute button.

You can solo several objects at once.

alt-clicking releases other pressed solo buttons, so that you only hear one channel ("Interlocking Solo" or "Solo Toggle").

alt-clicking any activated solo button removes the solo status from all audio objects.

Solo Safe

When you solo a channel, if you want to hear the signal together with its effects, the effect return channels should not be muted. Unlike conventional mixing desks, Logic Audio can scan the entire signal flow and leave the effect return channels open.

The same applies when you solo an effect return signal. The channels feeding the effect are muted ("taken out of the routing") but their effect sends remain open so that the effect still receives a signal.

Of course the automatic mute-suppression only applies to the internal effect returns. If you are using external effect units via bus objects, the scan will keep the effect master sends open. However, Logic cannot know which of the input objects you are using as effect returns for the external effect units. You need to manually switch these input objects to "solo safe" – just like in a conventional mixing desk.

⟨ctrl⟩-clicking an inactive solo button makes this audio object "solo safe". This stops it being muted when you solo another channel. »Solo safe« status is marked by a cross in the solo button.

⟨ctrl⟩-clicking again removes the solo safe status.

Mute Remote Control
Mutes used to be recorded as Volume Controller events. Now Controller #9 is used instead. This allows you to control muting via Environment buttons or hardware controllers.

Controller #9:

Value 127	Mute (actually any value except 0 or 64)
Value 0	Switch off mute
Value 64	Toggle mute

Cancel Process
You can cancel any processing of audio material in the Sample Editor by pressing Command-Period. The output material is then unchanged.

The same applies to Digital Mixdown in the Arrange window.

Creating Independent Audio Files
In the Audio window you have the option of saving all selected regions as independent audio files: **File > Save Regions as...**. You define the path in the file selector box. If you are editing several regions at once, the names of the regions are also used for the audio files. With individual regions (including stereo) you can enter the names in the file selector. The audio files created can be added back immediately (after an appropriate dialog prompt).

In the Arrangement, you also have the option of saving all selected sequences as independent audio files: **Functions > Convert Regions**

to individual Audio Files. The audio files are stored in the same folder as your original file. The files created are registered in the Audio window and the references in the audio sequences are updated.

Neutralizing Fader Values
⟨≋⟩-clicking a volume fader sets it to 90 (0dB)

⟨≋⟩-clicking a pan pot sets it to the middle

⟨≋⟩-clicking a send pot sets it to 90 (0dB)

Reconfiguring the Audio Hardware
The *Refresh Audio Configuration* key command renews the configuration of the audio hardware. With the CBX, all parameter settings are sent again. With ProTools, the whole virtual TDM mixer is reconstructed – including all TDM Plug-Ins.

Small Improvements
• The mono/stereo switch is now available in all audio objects (AV), not just recording track objects.

• LOGIC Audio automatically switches off the record-enable status of audio tracks if necessary, to allow an edit in the Sample Editor. (Space is reserved on the hard disk for record-enable tracks, which means it is not available for Undo files).

DAE and TDM

DAE Project Driver Mode
The first time you start the program with Session8 or ProTools Project hardware and DAE Version 2.95 or later, Logic Audio asks which driver mode should be used: Project or Session 8.

The **Preferences > Audio Extensions > Use Project Driver Mode for Session 8 System** option means you can swap modes later.

Advantages of Project drivers:

• Allows scrubbing with up to 2 audio tracks
• I/O routing for every track directly in the audio objects
• Up to 4 sends per track

Disadvantages of Project drivers:

• Internal/External mix modes not available

- Hardware Setup not available
- Routing (with Studio Interface) not available
- Only 4 EQs available in total (spread over all 8 tracks).

To help you decide:

If you want scrubbing, choose Project driver mode.

If you want 8 EQs and Session8 routing, choose Session8 mode.

Plug-In Start Window

Whenever you start TDM Plug-Ins, a small window opens. If there is a problem, this window should show which Plug-In are the cause. If you want to get rid of this window, you can switch it off by choosing **Pref-erences > Audio Extensions > DAE/TDM > TDM Setup Indicator** (preset:on).

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Logic

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Version 2.6
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Preface

Congratulations!

You have just purchased one of this millenium's most advanced sequencing/notation systems. Whoever recommended LOGIC to you must have been a real friend.

No matter whether you want to write songs at home or you are doing music production in a professional studio: LOGIC is the ideal system for all MIDI realtime applications.

"Sounds like a complicated piece of software," you might think. That's true, especially when you consider the functional power behind the program — but:

DON'T PANIC!

You don't have to know all of LOGIC's functions immediately to use the program successfully; you'll become familiar with the basics very quickly. Most of LOGIC's powerful features aren't apparent until they're needed, and even then it's simple and fast to use them.

By the way: According to our extensively researched statistics, you are a human being aged between 6 and 99 years, who really *hates* reading thick manuals from the first to the last page. Fortunately, this should not be necessary with LOGIC, but we have made this manual as readable as we can.

However, if you *are* just beginning to make music with your computer, you should first read the *Basics* chapter on page 1 - 1.

When you want to know how to install LOGIC on your computer or set up your MIDI hardware properly, you should read the *Installation* chapter on page 2 - 1.

Chapter 3 contains a compact Crash Course; we suggest that both beginners and experienced sequencer users go through it in order to get used to LOGIC´s basic functions.

The remaining chapters contain detailed information for the various parts of the program. Please refer to each section as necessary.

Enough said... let´s groove!

Logic

Preface

Lo**g**ic

Chapter 6 Arrange Window

Logic

Chapter 12 The Score Edit Window

Chapter 13 The Transform Window

Chapter 14 Song Settings and Preferences

Chapter 15 File Transfer

Chapter 16 Tempo and Synchronization

Chapter 17 Spotlights

Glossary

Chapter 1
The Basics

This chapter covers what you need to know about your Macintosh before you can use LOGIC. There is also a brief, very concentrated introduction to the topic of MIDI. If you are new to these topics, you may have to reread a few passages. This introduction is not intended to be a complete explanation of the MIDI Standard, just a summary of the practical basics (there are many other publications that cover the subject of MIDI in detail.) Finally, there is a discussion on the fundamental ideas and problems involved with sequencing and other kinds of MIDI software.

1.1　What do you need?

If you bought your Macintosh at the same time as LOGIC, it would be a good idea to spend at least a couple of days (more if possible) getting acquainted with the basic workings of your computer. The tutorial program "Macintosh Intro" supplied by Apple is very good for introducing you to the fundamental operating techniques. Once you're comfortable with the main Macintosh operations, you can then begin to get to know LOGIC itself. This saves us and those of you who are already familiar with the computer from having to deal with topics like "what is a window?", etc. Here is a list of terms which you should be able to recognize **before** you begin this manual.

icon	select	deselect
file	move	copy
folder	create	delete
window	open	close
program	scroll bars	scroll
mouse	click	double-click
disk	hard disk	memory

Of course, you don't need to know every technical detail about these terms, but you should have a rough idea of what each one means.

Are you sitting comfortably? Then let's begin.

1.2   What is MIDI?

MIDI stands for Musical Instrument Digital Interface, which was originally developed to facilitate the remote control of an electronic synthesizer from a keyboard. MIDI is like a standardized electronic "language" which all MIDI-compatible devices can speak.

A MIDI cable carries only digital information and has absolutely nothing to do with digital audio signals.

Two devices can be physically linked via 5-pin DIN connectors. An output (e.g. MIDI Out) must always be connected to an input (MIDI In) since the data flow in any particular MIDI cable goes in one direction only. A MIDI Thru port is an output on a device which simply passes on the data arriving at the MIDI In, while the MIDI Out transmits data which has been generated by the device itself. In its normal state, the MIDI bus between the keyboard and synthesizer is quiet. It is only when (for example) a key is pressed or released that a Note On or Note Off message is transmitted. Such a MIDI message consists of three associ-

ated packets of data called "bytes". A byte is nothing more than a number for which a specific meaning has been defined. Exactly what this meaning is depends on whether the byte in the MIDI message is sent first or later.

The first byte in a MIDI message is called the "status byte" and carries information like "switch this note on". This status byte is followed by two "data bytes". The first data byte contains the note number and the second contains the speed (velocity) with which the key was pressed.

The MIDI Standard numbers the notes from 0-127: for example, bottom C on a 5 octave keyboard is number 36 (don't worry, as a LOGIC user you won't have to remember this or convert it in your head — LOGIC always shows you the note name, which in this case is C1).

The velocity ranges from 1 (played very softly) up to 127 (played very hard). A velocity of 0 is equivalent to a "note off".

Of course, there are other types of MIDI messages apart from note on or note off messages which may have one, none or many data bytes. More on this later.
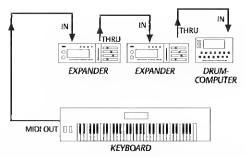
The synthesizer plays a note as soon as it receives a complete message telling it to do so (made up of three bytes — one status byte and two data bytes). It switches the note off again when it receives a complete note off message (also made up of three bytes). If this second message is not recognized, eg. because of a transmission error, the result is the notorious "stuck" note. (A stuck note can be generated artificially by unplugging the MIDI cable while holding down a key. Try this yourself — it won't do any damage.) So you can cope with this situation, there is the "panic" function which transmits an "all notes off" command. Unfortunately not all synthesizers respond to this, so there is also a "full panic" function which transmits individual note off messages for all note numbers on all MIDI channels.

MIDI Channels

The existence of MIDI channels stems from the need to play several sound modules (i.e. sound-generating instruments with no built-in keyboard) from one (master) keyboard. The devices are connected as shown in the diagram below.

Any modern sound module can be set to one of 16 receive channels. Likewise, the keyboard can be set to one of 16 transmit channels. The status byte of the note on message contains the information "switch on note on channel n" (n=1-16). This message is received by all the

sound modules, but only those which are set to the right channel will actually respond.

If you set two sound modules to the same receive channel you get a layered sound, ie. both sound modules play in unison.

By programming the keyboard so that, for example, below middle C it transmits on MIDI channel 1 and above it on MIDI channel 2, you get a "split keyboard" (one sound plays in one area of the keyboard, a second sound plays the remaining area.)

Multi Mode

Nearly all modern sound modules are "multitimbral", meaning they can generate several different sounds at once (e.g. bass, strings and piano). This is like having several sound modules in a single unit, each one capable of receiving on its own MIDI channel. However, you need to remember that the number of voices (notes) which can be played simultaneously by all these virtual sound modules is restricted by the limitations of the sound module itself. A 16-voice, 8-part multitimbral sound module which is already producing three-note chords on five MIDI channels (15 voices) can play only one note on the sixth MIDI channel (the sixteenth voice). If another note is required the "oldest" note has to be switched off in order to play the new note.

This effect, known as "stealing voices", is responsible for that feeling commonly experienced by musicians of having paid too much for their equipment.

Control Changes

Of course, MIDI can transfer more than just note information. A sustain pedal or the modulation wheel (to the left of the keyboard) can also

Logic

generate MIDI messages. Unfortunately (as this can prove confusing), both the operating elements (ie. the actual modulation wheels and data entry sliders on your synthesizer) and the messages they create are generally called "controllers", even though the full title for this kind of MIDI message is actually "control change message". Such messages are transmitted whenever the appropriate "hardware" controller is moved. **The control change message** also consists of a status byte and two data bytes. The **status byte** contains the information "a controller has moved" plus the information "on channel n" (n=1-16).

The **first data byte** contains a number from 0-127 saying **which controller** has moved. For example, controller #1 stands for the modulation wheel. Unfortunately, the allocation of the numbers is not based on any recognizable system. Some controller numbers define *which* hardware controller has moved, as in the case of the modulation wheel, while others say what *effect* the control change message should have on the sound generation. For example, controller #7 determines the volume of the sound on the MIDI channel where the controller message is located, and controller #10 governs the sound's stereo pan position.

The **second data byte** contains a number from 0-127 which indicates the **value** of the relevant controller. For example, in the case of the modulation wheel, it indicates whether the wheel has moved all the way to the bottom (=0) or to the top (=127) or somewhere between. The sustain pedal (controller #64) can only transmit the value 0 (=not pressed) or 127 (=pressed).

The fact that the value range spans 0-127 is to do with the way computers process numbers and how they are transmitted via serial interfaces like MIDI: ie. as binary numbers made up of zeros and ones. Don't worry: you don't need to necessarily know about this topic. You can skip the next section if you're not interested in how MIDI actually works.

Warning!
The following section is for Extreme MIDIots Only!!

A MIDI byte is made up of 8 bits (plus one start and one stop bit) which are transferred at a rate of 31.25 kbit/s. The first bit indicates whether it is a status byte (1) or a data byte (0). The values 0-127 can be encoded in the remaining 7 bits. With a status byte, in the case of a channel message 4 bits are used for the channel. These have the values 0-15 but are always referred to as 1-16. This leaves 3 bits in 8 possible combinations. Seven of these combinations are reserved for note on and note off, polyphonic and monophonic aftertouch, control and program change and pitch bend information. The eighth combination (111) turns the status byte into a system message. In this case the 4 channel bits are not required for the encoding of a channel, since these kind of messages are sent to all connected devices. Instead, they are available for distinguishing between the 16 possible system messages. Some of these (1xxx) are system real-time messages, consisting of just one status byte. This includes MIDI clock, etc. The rest are system common messages, like MTC or the system exclusive message which has no restriction on the number of data bytes.

Warning   Avoid using controllers #121 - #127. In older devices (and unfortunately also in some modern ones) these were used to switch to a different operating mode, eg. to tell a synthesizer to receive on all channels simultaneously, which never makes sense in conjunction with sequencers. If your sound module ever starts simultaneously playing all note information with all its available sounds go to the MIDI page of the device and switch Omni mode off.

Pitch Bend and Aftertouch

The pitch bend wheel and polyphonic aftertouch are not control change messages but have their own status byte (with two associated data bytes).

In the case of polyphonic aftertouch, the first data byte indicates the note number while the second data byte contains the mechanical pressure on the relevant key. Since the generation of polyphonic aftertouch requires a separate sensor for each key, only a few keyboards can generate this type of message.

With pitch bend information, both data bytes are used to obtain a higher resolution than 128 values. In theory, 16384 values are available to encode the position of the wheel. However, no keyboard on the market can distinguish more than 4096 values, and usually the resolution is much lower even than that.

Monophonic or channel aftertouch is also assigned its own status byte but this is followed by just one data byte giving the mechanical pressure on the whole keyboard (with a resolution of 0-127). In principle on-

ly one sensor is required, and consequently this message can be generated by most keyboards, even inexpensive ones.

Program Change

The last important MIDI message which you should know about is the program change (PrgCh) message. It also consists of one status byte for "change the sound program on channel n" (n=1-16), followed by a data byte (0-127) which gives the storage location number of the sound program to which the sound module is to switch. Some synthesizers instead of numbering their sounds from 0-127, number them from 1-128 (not 0-127), or in 2 sets (A/B) of 8 banks containing 8 sounds (11 - 88) or in 4 banks containing 32 sounds (A01 - D32). So don't be surprised if your Yamaha synthesizer always sets the program number one number higher, or if your Roland synthesizer reacts to program change #10 by switching to sound program A23 (set A, bank 2, sound 3). Bank 1, with its 8 sounds 11 to 18 are called up by the PrgCh commands #0 to #7. PrgChs #8 to #15 call up the sounds in the second bank (A21-A28), etc. The sounds in the second set "B" begin with PrgCh #64. This seems complicated, but you'll soon get used to it. If in doubt, it's usually quicker to experiment than consult a table.

When MIDI was defined in the early 1980s, no-one thought that more than 128 sound programs would ever be needed — but modern devices very often have more than this number sound programs. How can you access these via MIDI? There are two possible solutions — a bad one and a better one:

Program Change Table

The sound module contains a program change table. This is a table in which every incoming PrgCh message is assigned to one of the many internal sound programs.

There are a couple of disadvantages to this approach:

- There is still a limit of 128 addressable sound programs which have to be selected from the total range of available programs.
- It is not possible to listen to all the sound programs via PrgCh messages. Trying out new sound programs is often a good source of inspiration.
- If you ever want to use different programs you have to store the table along with the respective song via a MIDI dump (see below). This works but requires extra effort. Otherwise, if you alter the PrgCh table, your old songs will no longer play the correct sounds.

Bank Select

Recently many (but not yet all) manufacturers have adopted the practice of storing their internal sound programs in banks of 128 sounds. The PrgCh message works as normal within a bank. The banks are switched using controllers #0 and #32. Controller #32 switches the individual banks (0-127), while controller #0 switches groups of 128 banks, which should certainly be more than adequate for future synthesizers. If your synthesizer has no more than 63 banks of 128 sounds (which no synthesizer currently on the market does) you can directly enter the bank number in LOGIC without having to bother with controllers #0 or #32.

SysEx

Another type of MIDI message is the system exclusive message (SysEx). These kinds of messages are not aimed at just any synthesizer set to a specific receive channel, as other MIDI messages are; rather, you address a particular make and model of synth (or other MIDI device), regardless of what channel it is set to. The purpose is to transfer sound parameters and other system-specific data which are handled completely differently in every device.

Uh-oh! Here comes another MIDIot section:

These SysEx messages consist of a status byte followed by a series of data bytes. The data bytes begin with a manufacturer's ID followed by an ID for the type of device and an ID for the individual device itself (device ID) which can be set on the device in the same way as the MIDI channel. This is a way of distinguishing several devices of the same type used in a MIDI setup. Then come the actual data bytes which vary in number according to the type of device and the information transferred. Right at the end comes another status byte which signifies the "end of system exclusive transfer" (EOX). The MIDI bus is then free for other uses.

Dump

One use for SysEx messages is for editing individual sound or effect parameters in the computer. Another use is the transfer of a whole sound program or even all the sound programs in the device. Such transfers are called "dumps" and can be initiated at the device itself or remote controlled via a special SysEx command known as a "dump request" (see also page 1 - 9).

1

Other MIDI Messages

These are used for purposes like synchronizing a sequencer to a tape machine or to an internally-programmed drum machine. If you have ever tried to simultaneously start a drum machine and a sequencer set to the same tempo in the incredibly vain hope that both devices will stay in time for the duration of a whole song, you will know why synchronization is a good idea. Fortunately, this manual contains a whole chapter on synchronization to keep those gray hairs at bay (see also page 16 - 1).

Other MIDI Devices

This manual generally uses the keyboard to represent any MIDI note-generating instrument, but this is for the sake of simplicity rather than accuracy. Of course drum, wind and string instruments fitted with MIDI have been around for a long time now, and musicians who use them should not feel discriminated against, particularly when their specific playing techniques can be only poorly imitated on a keyboard.

1.3   Librarians and Editors

Librarians

A Librarian is a type of software which can be used to organize the sound programs in synthesizers or the effect programs in effect units. The transfer to and from the computer is done using SysEx messages as described above. If you have already had some practical experience with a MIDI system you will know that searching for the **right** sounds can sometimes be a right pain in the DIN socket. In particular, compiling your own sound banks without the aid of a Librarians is a truly tedious task. If you have more than two different devices in your MIDI system you will almost certainly want to get a universal Librarian which is not limited to one type of synthesizer or effect unit. It is also very useful to be able to create your own sound library containing all your devices. This means you can configure your whole system at the push of a button, without having to remember which sound bank was used in each synthesizer for the relevant song or project. One software product which fulfills all these requirements and also has the advantage of being able to work closely with LOGIC is **EMAGIC**'s **SoundSurfer**, where you can directly select the sounds in the sequencer using their names.

Editors

An Editor is a type of software which lets you use the computer to set the sound parameters in a synthesizer or the effect parameters in an effect unit. Here too, communication takes place via SysEx messages but fortunately the exact byte order is of interest only to the programmer of the editor software. The advantage over sound programming on the device itself is primarily the far clearer display of a computer monitor compared to the often rather spartan two-line LCDs on synthesizers.

The same thing applies to editors as to librarians: if there are more than two different devices in the setup, for economic reasons you should get hold of a universal editor. You should ensure that adaptations are available for your own devices and check what they cost. If you own any rather exotic devices, the option of being able to program your own adaptations is also very useful. Even if you don't feel like doing this yourself there may well be other users who have made the effort.

EMAGIC's **SoundDiver** distinguishes between two types of adaptations:

- **Modules** can cope with the peculiarities of a device as well as a specialized editor program, but they are not programmable by the user.

- **Adaptations** are programmable by the user for use with the MIDI device of your choice. Of course you need time and a complete SysEx documentation for the device.

At present some 200 modules and adaptations are supplied with SoundDiver. You also get the complete SoundSurfer software which makes it easy to organize your sounds. Finally, there is also the advantage of being able to work closely with LOGIC. For example, you can start the sequencer while you are editing a sound.

1.4 Sequencers

Sequencers were originally devices with a selectable tempo which transmitted a sequence of control voltages, determined by a series of knobs on the front panel. These control voltages could be used to affect, for example, the pitch of an analog synthesizer. Other sequences

of control voltages running in parallel could be made to affect the volume or some other sound parameter, like the duration of the present step in the sequence (note length). The capacity was usually 16, or exceptionally 32 steps (notes) which elevated monotony to the level of a musical stylistic device. Subsequent digital hardware sequencers had the advantage of being able to remember more notes but were harder to program. For most peoplem, these have been almost completely replaced by software sequencers, which have the advantage of larger and clearer displays.

There are some diehards who still swear by a few specific advantages of analog sequencers. In fact, for the first time, the current LOGIC Version 2.5 makes some of these features possible on a software sequencer (see also page 17 - 1).

In practically all sequencers nowadays the tracks are laid out vertically and MIDI signals are recorded in the order they are played from left to right. Thus everything which is aligned vertically is played simultaneously and everything which is aligned horizontally is (normally) played by the same synthesizer with the same sound.

When you are recording a track you want to be able to hear the sound which the track is eventually going to play. In practice, this requires that you adopt a certain procedure which should be thoroughly understood.

The MIDI Thru Problem

If you are using a master keyboard with no sound generation of its own the situation is straightforward. When you select a track in the sequencer, either for practicing or recording, the MIDI data generated by the master keyboard must be diverted to the MIDI input of the computer. The MIDI channel information must therefore be altered and replaced by the channel setting for the relevant track. This means that if you change to another track (with a different MIDI channel setting) you immediately hear the sound of the sound module receiving on this channel, which is the sound you eventually want to record on this track. The problem arises when you are recording from a keyboard that has a built-in synthesizer which you actually want to use (if you don't want to use the built-in synthesizer just turn the volume down).
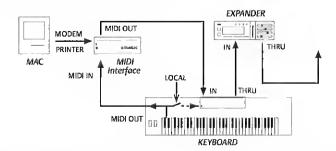
Of course, when you play such a keyboard, especially if it is not connected to a computer, you expect to hear a sound as soon as you press a key. This is done by transmitting the MIDI information from the built-in keyboard directly to the built-in synthesizer.

However, in our computer setup, this means that when you are recording you will hear not only the intended sound playing (say on a separate module) but also on the internal synthesizer. Even if you want to record the internal synthesizer on this track as well, this causes problems because while you are recording you will hear the notes played double. The note information is heard once directly and once diverted through the computer. This halves the number of voices, as well as producing a peculiar flanging effect.

Local Off

To avoid this problem, practically every keyboard with a built-in synthesizer has a parameter called "Local" or more fully "Local Control"(usually in the MIDI or Utility page, if in doubt consult the keyboard's manual). This parameter has two possible values: "On" or "Off" which refers to the internal connection between the keyboard and the synthesizer.

When using an external sequencer like LOGIC, you should always switch this parameter to **Off**. This means that the keyboard and the internal synthesizer behave like two separate devices. On many synthesizers this parameter is automatically set to "On" whenever you turn it on, so unfortunately every time you turn on the device, you have to switch the "Local Control" parameter to "Off". If you have a synthesizer which stores the setting of this parameter, the next time you feel a spontaneous live gig coming on you'll need to be able to switch "Local Control" back on again. So before you read on, have a look where this parameter is on your device and make sure you can remember how to find it — I'll just wait until you're ready.

Incidentally, "Local Control" can be switched on and off using controller #122 (value 127 = On, value 0 = Off).

Chapter 2
Installation

2

2.1   Supplied components

Your LOGIC package contains the following components:

- This manual;
- A LOGIC program disk;
- One or more disks with additional files (support disks);
- A hardware copy protection (key);
- A short ADB cable;
- A registration card.

Please fill in the registration card *immediately* and send it to the sales department in your country. This is the only way to ensure that you will be kept informed of the newest updates and if necessary have access to our telephone hotline service.

2.2   Hardware Installation

The key

Sadly not everyone is completely honest, which is why LOGIC is copy-protected. For you, as an honest user, the advantages of this are that we will help you with any problems, and that we can keep improving LOGIC.

The key is the small black box fitted with two ADB (Apple Desktop Bus) ports. You cannot start LOGIC unless this key is connected to your computer.

Connecting the key
- Switch off your Macintosh.
- Disconnect your keyboard's cable from the computer.

- Insert the supplied ADB cable into the port on the computer where you just unplugged the keyboard cable.
- Insert the other end of the ADB cable into either of the two ADB ports on the key.
- Now connect the keyboard to the other ADB port on the key.

If there are two ADB ports on your computer you can leave the keyboard cable where it is and connect the key to the other ADB port on your computer.

It doesn't matter where the key comes in the ADB chain. You could even insert it between the keyboard and the mouse - it will still function properly.

- Switch your Macintosh back on.
- Make sure the mouse and keyboard are working correctly. If not, check that all the cables are fully plugged in.

MIDI Interfaces

To run LOGIC, you need a MIDI interface. Since Macs don't have one built-in out of the box, you will have to buy one. Basically, there are two sorts of interfaces:

Interfaces with one MIDI port

have one MIDI In port and one or more MIDI Out ports. If you want to address several devices or several sounds in one device (multi mode) all you have available are the 16 MIDI channels defined in the MIDI Standard. If the interface has several MIDI Out ports they all carry the same MIDI signal, so essentially they are all part of the same MIDI port. The advantage of several Out ports is that you can connect your devices directly to the interface instead of using a MIDI Thru chain. Some devices, such as very small drum machines, don't have a MIDI Thru port. If you have only one such device, you can place it at the end of the MIDI chain, but several devices without Thru ports can cause problems if the interface has only **one** MIDI Out port. If this is the case in your setup, you should buy a MIDI interface with one MIDI In port but several MIDI Outs, which are usually not much more expensive (Emagic's Log2mac is a good example of this).

If you already have an interface with just one Out port, but you want to connect more than one device without using MIDI Thru ports, you'll have to buy a MIDI Thru box. These boxes have one MIDI In and several MIDI Thrus.

EMAGiC

Because of the circuit technology used in MIDI, it is not possible to con- **Note**
nect **one** MIDI Out with **several** MIDI Ins via a Y-cable!

Interfaces with several MIDI ports

If you have more than two multitimbral MIDI devices, it's better to use
an interface with several MIDI ports, each individually addressable from
the computer. This allows you to transmit separate MIDI signals to the
MIDI Outs each of which has its own 16 MIDI channels for controlling
your sound modules and synths. The only disadvantage of these inter-
faces is their higher price tag. They usually come in the 19-inch rack-
mount format, and have several MIDI In ports. This is also useful if you
want to use an Editor or Librarian program because you have to con-
nect the MIDI outputs of the sound modules to the MIDI inputs of the
computer.

Mark of the Unicorn

One interface that sets a standard in this area is the MIDI Time Piece
(MTP) made by Mark of the Unicorn (MOTU), with 8 inputs and 8 out-
puts. Other interfaces can emulate the MTP (ie. function in the same
way with the computer). These include MOTU's inexpensive MIDI Ex-
press from with 4 inputs and 6 outputs.

Opcode

The company Opcode also manufactures interfaces with MTP emula-
tion modes: the Studio 4, with 8 inputs and outputs, and the Studio 5,
with 15 inputs and 15 outputs. These interfaces can be addressed as
though they were MTPs.

This means that if you are running the Opcode interfaces, you don't
need to install the OMS software supplied with the interfaces. If you
have no other need to run OMS, it's a good idea not to bother installing
OMS at all: LOGIC's Environment offers all the functionality of OMS
(and more besides!), except of course that the Environment can only
be used by LOGIC. The real advantage of this OMS-less approach, how-
ever, is that the LOGIC-specific MIDI driver is much faster than OMS.
(There's more on this subject in the section *The Environment and OMS*
on page 7 - 61).

SMPTE

All the above-mentioned interfaces have SMPTE ports for synchroniz-
ing the computer to a tape machine (see also page 16 - 1).

Please bear in mind that the interfaces mentioned are only a small se-
lection of what is available on the market.
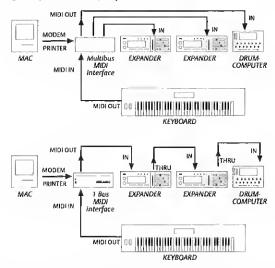
Connection

Regardless of what MIDI interface you have, the computer and the interface are connected either via the printer port or the modem port on your Macintosh.

Normally you will use the modem port and leave the printer port free for its originally-intended purpose.

Connect your equipment according to whichever of the above diagrams applies to your type of interface, while also paying attention to the manufacturer's instructions for the MIDI interface.

EMAGIC

LOGIC

2.3   Software Installation

It's likely that one of the reasons you bought a Macintosh in the first place is that chapters on this subject generally tend to be very short.

Installation procedure

- Insert the LOGIC 2.5 program disk into the disk drive. A window appears containing one or more icons.
- Double-click on the "Install LOGIC 2.5" icon.
- After a short greeting, a file selection box appears for you to determine where on your hard disk the >LOGIC 2.5< folder should be stored. In addition, now is the time to decide if you want to install all of the files stored on the program disks, or just some of them.
- »Easy Install« copies all the files to your hard disk, and a LOGIC folder is created for them there.
- »Custom Install« lets you install just selected groups of the files. To do this, select "manual install" from the pull-down menu on the top left. This lists the install choices; just click on the entries you want to install. As you do this, you can see, how much space will be required on your hard drive to complete the installation .If you click on the small "i" button, you will receive more information on the various files. Incidentally, the LOGIC folder is still created on your hard drive when you use custom install.
- When you have made your choices, click on »Install«, and installation will commence. Have the other disks to hand and insert them when you are asked to do so.
- After installation is complete, a restart will be necessary; this will happen automatically.

After the restart, you should be able to find all the files you selected in the LOGIC folder, on the harddrive you specified at the start of the Install procedure.

Please keep the install disk in a safe place, ie. **not** in the vicinity of speakers, power modules or computer monitors! Heaters and deep freezers are also **unsuitable**. After installation, it's a good idea to make an alias of the "LOGIC 2.5" program (using the **File > Make Alias** function in the Finder) and then drag the alias into the "Apple Menu" folder in the System folder. This means you always have direct access to LOGIC via the Apple Menu.

Update Info

After installation, you should find this file in the LOGIC folder. It contains some last-minute additional features of LOGIC which could not be included in this manual before it went to press.

2.4   Hotline Service

Because of the vast number of different types of computers, and the still greater number of possible uses the owners of all these computers could be putting them to, we cannot ever say with 100% certainty, despite careful programming, that you'll never encounter any problems when working in certain situations.

If you do run into trouble while using LOGIC, please check first whether there is anything in this handbook or in the Update Info file that can help you with your problem. In many cases, it helps if you read a more detailed description of the function you're using; this can often explain unexpected behaviour on the part of LOGIC, and help you get things back under control.

If you can't solve your problem like this, you have the option, as a registred user, of contacting us via our telephone hotline service, where our product specialists will be happy to help you further — provided, of course, that you have sent us back your completed registration card.

Please have the following items ready:

- The original program disk with program name, version and serial number (we cannot help you if you do not have your serial number);
- This manual;
- Information on the type and model of computer you are using, its processor, and the amount of RAM you have installed.
- Names of the programs and system extensions you are running alongside LOGIC.

Telephone Number

The Hotline number is 916 - 477 - 1051 (USA).

The Hotline in Germany is +49 (0) 41 01 47 65 65.

We can only offer help on this number. Please do not ring any other numbers you may have listed for **EMAGIC**!

Non-Hotline Problems

If you have problems with the score side of LOGIC, please write to us. Enclose a sample printout of a disk with a test song exhibiting your problem; problems with notation are always easier to sort out if you have printed examples to hand.

Please also fax or write to us if you have any criticisms or suggested improvements. We look forward to any feedback you'd like to share with us (as long as it isn't actually dangerous... :)).

Our address is given at the front of this manual.

If you have problems getting LOGIC to work with devices made by other companies, like tape machines or hard disk recordingsystems, please consult your music equipment dealer. He knows your personal setup, and can tell you who you really need to speak to to solve your particular problem.

2.5   LOGIC Updates

LOGIC is in a process of continual development, and of course user feedback is crucial to this process. For this reason, we would like to thank the countless users of LOGIC worldwide for their constructive criticism, suggestions, and of course their praise over the years! Your reactions are an important incentive to us for making LOGIC better and better. We cannot answer every letter immediately, and ask for your understanding on this — all we can do is look at your suggestions in order of their urgency.

Sub-Releases

From time to time, all users will be sent improved versions of LOGIC — so-called sub-releases — free of charge. These versions can be distinguished by their three-character version numbers (eg. 2.5.3). Sub-releases come as installers that require an existing full version in order to work (ie. the versions with two-character version numbers, like 2.5, which we're afraid you *do* have to pay for!).

To obtain sub-releases, you can ask our associates at workshops or exhibitions for the appropriate disks; or we can send them to you if you

wish. If you have access to a modem, the following option is also open to you:

Mailbox (BBS)

You can download sub-releases for all computer platforms with any communications terminal software. Please use at least a 14,400 modem with the baud rate set to 19,200. If your comms software supports it, please use the Z-modem transfer protocol for the download.

The two possible phone numbers are:

1:              +49 (0) 4101 47 65 71

2:              +49 (0) 4101 47 65 77

When you log on, you will be asked for a user ID and password. You can answer these requests like this:

User ID: LOGIC USER

Password: UPDATE

The mailbox works in a fairly old-fashioned way — you enter numbers to select the various menu options. There is a reason for this — we're not stuck in a 1985 time warp, honest! — it means that all computer users have access, irrespective of their platform of choice. Please be patient.

Internet

Of course, you can contact EMAGIC via the internet. If you have internet access, we kindly invite you to visit our web sites.

The international web site of EMAGIC:

http://www.emagic.de

The homepage of EMAGIC, Inc. in the USA:

http://www.emagicusa.com

It's also worth publicizing the address of some pages maintained by a user group in England, as you can download the latest versions from these as well. The URL is:

http://www.mcc.ac.uk/~emagic/emagic_page.html

Logic

Chapter 3
Crash Course

Welcome to the LOGIC crash course!

The first section contains a few you tips on how to get your system "up and running". Once you have managed to do that the most difficult part is over! You can then go straight to *First Round Trip* on page 3 - 5.

Second Round Trip on page 3 - 23 is an extension of the crash course which gives LOGIC beginners or "converts" from other programs more information on options and working methods. If you can't or won't read the whole manual this section gives you the most concise description of LOGIC's functions plus references to sections of the manual where you can get more details. Allow a few hours for the whole course. The best approach is to read the book with the computer in front of you. If you can't do that you can also work through the course "dry".

The other chapters in this manual contain detailed descriptions of all the functions and are not based on the crash course.

As a "computer musician" (for lack of a less horrible term) you will soon be spending a lot of time in front of the screen. You should therefore pay some attention to the ergonomics of your work place: **Ergonomics**

- The top edge of the monitor should be slightly below eye level, there should be no reflections off the screen from lamps or windows and the area around the monitor should be well lit but not dazzling.
- The seating should give good support for your pelvis, your legs should form a right angle with your feet flat on the floor.
- The MIDI keyboard and computer keyboard should be at a height where they can be operated with your arms at a right angle and shoulders relaxed.
- Any MIDI sound modules, your mixing desk and other operating elements should be accessible without too much stretching.

It is normal to spend many hours in the same position in music production but that doesn't make it healthy. You should get in the habit of taking regular breaks involving some physical movement, especially if you don't compensate in other ways (by doing physical work or exercising).

Also, a heavy-gauge lead apron is recommended to minimize the effect of radiation from your monitor (just kidding, we hope!)

3.1   How does it Work?

We are assuming that you have already made the necessary audio and MIDI connections for your system. If not, please see the chapter dealing with *Installation* on page 1.

In this chapter and the tutorial song it is assumed that there is a MIDI interface connected to the modem port. There should be a multitimbral sound generator connected to this MIDI interface and if possible this should comply to the GM standard (although it doesn't have to!).

Loading the Tutorial Song

Start LOGIC and load the supplied tutorial song. You can do both things simultaneously by double-clicking the tutorial song icon:

Tutorial Song

If LOGIC was already started you must first close the Autoload song by choosing **Close** from the **File** main menu (from now on this will be referred to as simply **File > Close**). A dialog box appears asking you whether you want to save the song first; answer with "Don´t Save", then choose **File > Open**. A file selection box appears where you can open the tutorial song.

A fundamental concept essential to working with sequencers is MIDI Thru. Please refer to *The MIDI Thru Problem* on page 1 - 11 and the following section *Local Off* on page 1 - 12.

If you are using a keyboard switched to local off or a master keyboard please refer to *Situation* on page 3 - 3.

If you are using a multitimbral keyboard, go to the MIDI menu and set a transmit channel or TX Ch which is not being used by any of the sound generating sub channels as a receive channel. This is equivalent to the local off function, because you will then not be able to play the internal sound generator directly. See *Situation* on page 3 - 3.

Switching off Midi Thru

If you are using a monotimbral master keyboard controller, switch it to omni off. If it cannot be switched to local off and you want to use the
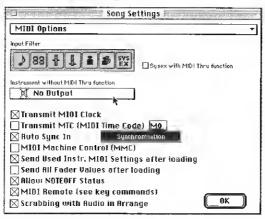
internal sound generation you need to set up LOGIC so that events will *not* be routed through to the MIDI channel of your synthesizer.

Choose **Song Settings** from LOGIC's **File** main menu.

A dialog window appears where it should say **MIDI Options** in the frame at the top. If it doesn't click this frame and hold down the mouse button. A menu appears where you can choose **MIDI Options**.

You will then see the following window:
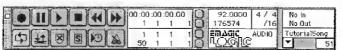
The mouse pointer is on a field above which it says *Instrument without MIDI Thru function*. Click this field and hold down the mouse button. A menu appears where you choose the item that corresponds to the MIDI transmit channel of your synthesizer (1-16).
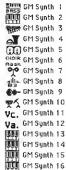
Situation

Once you have established the situation described in the next few paragraphs you can proceed directly to *First Round Trip* on page 3 - 5:

*   When you play notes you should see a display of the incoming notes in the top right of the transport window (where it says "No In" in the diagram below).

If no notes are displayed check the MIDI connection between the keyboard and the interface and the serial cable between the interface and the computer. Is everything switched on and has every-

thing been installed correctly? Check the instructions in the interface manual. Have you loaded the tutorial song?

- By selecting the different tracks in the track list shown in the diagram by clicking the icon or using the cursor keys (arrow keys ⬆ or ⬇) you should be able to play all the different sounds on your sound generator(s).

1   1 Synth Bass 1
2   2 Marimba
3   3 Muted Gt.
4   4 Brass 1
5   5 SynVox
6   6 Choir Aahs
7 Va. 12 Viola
8 Vc. 11 Cello
9   7 Steel Drums
10   8 Organ3
11   9 Pizzicato Str.
12   13 Pizzicato Str.
13   (Folder)
14   10 STANDARD
15   10 STANDARD
16   8 Organ3
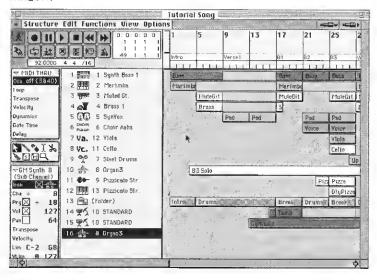
Your sound generator must be in multi mode, which depending on the manufacturer/device is probably called combination, "super" mode or multitimbral mode. On some workstations the mode for the internal sequencer must be activated. Refer to the manufacturer's manual. The different sounds should be set to different channels.

3.2   First Round Trip

Section 1

Once you have loaded the tutorial song you should be able to see this
window:

If you have connected a GM sound generator all the sounds will already
be correctly set. If you haven't, use the following sounds shown on the
channels given below:

Cha	Sound	Cha	Sound
1	Moog bass	2	Marimba
3	Mute guitar	4	Brass or trombone
5	Synth voices	6	"Ah" choir
7	Steel drums	8	Hammond B3
9	Pizzicato violins	10	Dry drum kit
11	Cello	12	Viola

Don't spend too much time searching for the exact sounds. The tutorial song should merely enable you to concentrate fully on learning the program instead of writing your own music. There will plenty of time for that later!

The Drum Sounds:

Note	Sound	Note	Sound
B0	Pounding bass drum	C#2	Crash cymbal
C1	Dry bass drum	D#2	Ride cymbal
D1	Hard brush snare	F2	Ride bell
F#1	Closed hi hat	G2	Splash cymbal
G#1	Pedal hi hat	A4	Woodblock
A#1	Open hi hat		

Start!

To start the song click the play button in the transport window. You can also use the ⓪ key on the number pad of the computer keyboard.

When the song is running you will see a vertical line moving from left to right across screen. This is the song position line.

To stop the song click the stop button in the transport window or use the ⊡ key in the bottom right of the number pad.

If you click the stop button again when the sequencer is stopped the song position line is reset to the song start.

Sequences and Tracks

The grey horizontal beams with labels are **sequences**. These are where MIDI notes were recorded as the song position line passed over them. Each of the horizontal lines containing the sequences is called a track.

Selecting Tracks

You select a track by clicking with the mouse on the icon or on the name of the track instrument.

Whenever you play notes on your MIDI keyboard you will hear the sound of the selected track. Try this out on different tracks.

The track determines not only which sound you can currently play, but also which sound is played by the sequences on this "line". Click the **marimba** sequence at the beginning of the second track and hold down the mouse button (this is referred to throughout the manual as "grabbing". The mouse pointer will then turn into a little hand.) Drag this sequence onto track 9 (the track number is shown on the far left) whose track instrument is *Steel Drums*.

Leave the sequencer running. You will immediately hear the difference in the sound played by this ostinato sequence.

Don't touch the row of gray beams with no writing on them to the right of the sequence. These are known as loops, i.e. automatic repeats of this sequence until the next sequence on the same track. Just click the loop parameter in the sequence parameter box (top left).

This allows you to turn the loop function on and off. Click some of the other sequences. You will then be able to see their respective parameter boxes and change their loop parameters, if necessary.

Now move the **marimba** sequence back to track 2.

Instrument

You now know that the sound of a sequence depends on which track the sequence is played on. This is because for each track there is a different **instrument** set in the track list. This is shown in the track list by an icon and a name, for example:

The **instrument** determines which MIDI channel and MIDI output the MIDI events on this track are sent to. In a way it therefore represents a module ("part") in your multitimbral sound generator. The track list shows the Midi channel number.

The most important question now is how can the sound of an instrument be changed without having to reset the program number manually on the sound generator?

Changing the Sound of an Instrument

First select a track, e.g. track 16 (instrument *Organ3*:).

You will now be able to see the relevant **instrument parameter box** in the bottom left of the screen.

If you can't see the whole instrument parameter box use this little trick: click the triangle in the top left of the **sequence parameter box**. This is the box in the top left corner of the screen.

This closes the sequence parameter box and the elements in the parameter box below it move upwards.
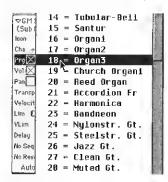
If you are using a 15" (or larger) monitor you should be able to see all the boxes on the left side simultaneously.

Now play a few notes on your master keyboard. If you can't hear any sound your sound module is not receiving on channel 8. Select a track with a different instrument or set your sound generator to receive on channel 8.

Now click the *Prg* line in the instrument parameter box as shown in the diagram and hold down the mouse button. The following flip menu appears (don't get scared and let go of the mouse button!)

Keep the mouse button held down and move the mouse up or down. Then release the mouse button. If you have connected a GM sound generator you should now be able to hear the corresponding sound when you play your keyboard.

You can also use the ⊞ and ⊟ keys to alter the most recently changed parameter in single units. Try this now on the sound program numbers!

Adjusting the volume of an instrument

You can also use the instrument parameter box to set the volume of an instrument.

Click the number in the *Vol* line and move the mouse up and down while keeping the mouse button held down. This method of inputting is known as "mouse as slider". If you play the keyboard whilst doing this you will be able to hear the difference.

There should be a cross in the checkbox. Alternatively, you can preselect a value and then send it by placing a cross in the checkbox.

The concept of an Instrument

Changing the program number or volume affects the behaviour of the entire synthesizer, (or of that particular part in a multitimbral synthesizer).

It is therefore not possible to play a single channel in a sound module using different tracks set to different sounds or volumes.

For this reason, these parameters in LOGIC are assigned not to a track, but to an "instrument", which is in turn assigned to a track.
Thus every LOGIC instrument is directly related to one of your sound modules.

If you alter the instrument parameters, this affects all tracks which are being played via that instrument.

Assigning an Instrument to a Track

To assign a different instrument to a track grab the icon or name of the instrument in the track list. If you keep the mouse button held down a flip menu appears where you can set a different instrument. Try this out with instrument *Choir Aahs* on track 6.

Choose another item and release the mouse button. The whole of track 6 will then be played by another channel of your sound module. Channels 14 to 16 are not yet being used in the Tutorial Song.

Movement!

The transport functions (from left to right): RECORD, PAUSE, START, STOP, REWIND and FAST FORWARD will already be familiar to you.

As with a tape deck, if you rewind or forward while in PLAY mode you can hear the track. By grabbing these buttons with the mouse button held down and moving it horizontally you can vary the speed and direction.

Song Position

00:00:35:04.14
14 2 4 167

The current song position is shown to the right of the row of buttons with the time above and the bar position below. The bar position is divided into bars, beats (equivalent to the denominator of the time signature), sixteenth notes (or some other adjustable format value) and ticks (1/3840 notes).

You can also set the song position directly by clicking the lower part of the bar ruler:

3

Double-clicking it allows you to toggle between STOP and PLAY.
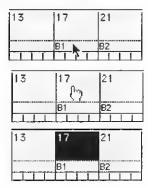
The names in the bar ruler (intro, part A, etc.) are called markers. If you click the bottom part of the bar ruler while holding down the ⌘ key the song position line is set to the start of the marker.

Try playing with some of these functions. See what happens when you hold down the mouse button with the sequencer running and move the mouse horizontally in the bar ruler.

Cycle
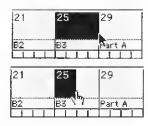
You may have already tried clicking in the top part of the bar ruler. This is where you define the cycle region which is a section of the song that is constantly repeated. It is very useful for composing and editing.

Suppose you want to edit the section of the song called B1. Click the "B1" marker, hold down the mouse button and move the mouse upwards. Then release the mouse button.
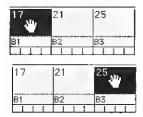
You don't have to stop the sequencer to alter the cycle. Once the song position line reaches the end of the cycle region it jumps back to the start.

To set the cycle region without using the markers click the top part of the bar ruler at the start or end point and drag out the region to the left or right. Then release the mouse button.

You can alter the limits of the cycle region using the same method. Just grab the cycle beam in the bottom half near one of the limits.

If you grab the cycle beam near the top or middle you can move the whole region without altering its length.

Clicking anywhere in the top half of the bar ruler turns the cycle on and off.

You can carry out the same function using the cycle button in the transport window.

The start and end of the cycle region is shown below the song position display:

You can also enter or alter the positions here. The two positions are known as the left and right locators.

Spend a bit of time experimenting with the cycle functions.

Selection

Selecting sequences means preparing them for editing by clicking them. This has to be done before you can carry out any kind of editing.

- "Rubber band selection" selects all sequences within a frame that you drag out with the mouse button held down. Normally you start dragging out the rubber band at an empty point where there are no sequences. However, if there is no empty space in the background you can also begin dragging on a sequence by holding down the ⌥ key.

- You can select more sequences by clicking them while holding down the ⌥ key. In fact (as with rubber band selection) this toggles the selection status.

- When you select a track all the sequences on the track are selected too.

- There are also a few functions in the bottom part of the Edit menu for selecting according to specific criteria. The most important is: **Select All** (or ⌘Ⓐ).

Click the background to get rid of the current selection.

Toolbox

The toolbox is located between the sequence and instrument parameter boxes:

You can select different tools by clicking them. They all have different effects when you click sequences with them. More details will be given later in the course.

Solo

Set the cycle around part B1. Click the solo button in the transport window.

Initially you won't hear anything, even with the sequencer running. Select the "Bass", "Marimba" and "MuteGit" sequences with the ⌥ button held down.

In solo status only the selected sequences are played. Click the solo button again to switch the solo function off.

Mute

Select the mute tool from the toolbox. This allows you to mute individual sequences (or all selected sequences). Alternatively you can use a key command (preset: ⌥Ⓜ).

To mute a whole track you have to use a special tool. Move the mouse to the left of the track number where you can see the small monitor display. The mouse pointer turns into a mute tool. You can mute the track (or remove a mute) by clicking here with the mouse.

Try muting track number 10 (instrument *Organ3*) containing the "Organ Solo".
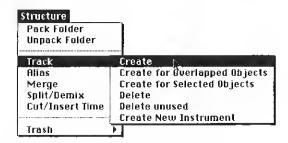
You can then play a much better solo on your keyboard.

Section 2

You are probably eager to record your vastly superior solo!

Creating a New Track

Choose **Track** from the **Structure** menu. Move the mouse pointer to the right onto the **Create** item in the pulldown menu. Then release the mouse button.

You have now been formally introduced to LOGIC's hierarchical menus. From now on choosing menu items like this will be referred to as **Structure > Track > Create.**

A new track with the same instrument will have been created under the track with the old solo. The new track will already be selected so you are ready to go. You can also create a new track by double-clicking

in the white area below the track list; this will be assigned the last selected instrument.

If you want to record a section of the solo in cycle mode (or mute other tracks so you can use a few harmonies), no problem.

Record

Press the record button or the asterisk key in the top right of the number pad on the computer keyboard.

To delete an unwanted recording and simultaneously begin recording again just press the same key.

You can go into and out of record with the sequencer running by using the *Record Toggle* function (⌨ key).

If you have recorded a few new tracks with solos on them they may look something like this:

Some parts will be better than others. If would be nice if you could edit the good bits together.

But first:

Saving a Song!

After a good recording or successful edit it is a good idea to save the song.

The first time you do this choose **File > Save as.** You can enter a new name under which the song is saved.

From then on you can save the song just by choosing **File > Save** or pressing ⌘Ⓢ (without entering a name).

If you make a bad mistake you can call up the most recently saved version by choosing **File > Revert to Saved.**

Editing Sequences

Deleting

Use the eraser tool – or the ⌫ (backspace) key – to delete any sequences that are not required. Be careful! Clicking a selected sequence with this tool deletes all the other selected sequences as well. To delete an

individual sequence first click in the background to deselect all the other sequences.

However, this function has its uses. For example, you can select all muted sequences by choosing **Edit > Select Muted Sequences** and then delete all these sequences with a single click.

Undo
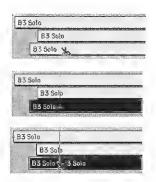
If you decide that you want to keep the deleted sequences after all, you can reinstate them (as with any other unintentional function) with the help of the **Edit > Undo** function.

Cutting

Click the scissors. The mouse pointer turns into a pair of scissors which you can use to cut the sequences.

Click one of the solos and hold down the mouse button. As you move the mouse horizontally you can see its exact position in the top of the window. The notes are also output as the mouse travels over them.

Once you have found the exact cutting position release the mouse button.

You can now cut the organ solos into several sequences. As you do so all the selected sequences will be cut at the chosen point. If you hold down the ⊠ key you can make multiple selections with the scissors as well!

Joining

To merge cut sequences, select the relevant parts and click with the glue tool.
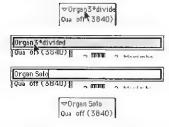
Copying Sequences

If you hold down the ⌥ key while grabbing and moving sequences the sequences will be copied instead of moved (just like copying files in the Finder).

Altering Names

To edit the name of a selected sequence just click the top line of the sequence parameter box. An input field appears:

Type in the name on the computer keyboard and press the ↵ key.

Alternatively you can enter a name by directly clicking the sequences with the text marker.

Altering the length

If you want to remove some notes from the end of a sequence, there is an easier way of doing this rather than cutting the sequence and muting the last part: just grab the bottom right corner of the sequence and move the end to the left.

If you then use the same method to lengthen the sequence again, the notes in the last part will be played again.

Note: if you hold down 🔲 while you adjust the length of the sequence all events in the sequence will be time-stretched (or squashed)!

Quantizing

Quantization allows you to rhythmically correct any loosely played notes. Select any organ riff with suspect timing. Click the small triangle in the top left to open the sequence parameter box again.

In the second line is the *Qua* (quantization) parameter. Next to it you can see *off (3840)*. If you click this field (and hold down the mouse button) a flip menu opens (don't be alarmed). This is where you define the quantization grid. Experiment with it for a while. You can revert to the original recording at any time by choosing the bottom item: *off (3840)*.

To check the effect of the quantization function choose **Functions > Set Locators by Objects** (🔲🔲and the locator points will be set so that the cycle region matches the selected sequence (or several selected sequences). Switch on cycle mode and start the sequencer.

All these functions can be called up simultaneously via the key command *Set rounded Locators & Play.* Just press the 🔲 key on the numeric keypad.

All the key commands can be reassigned to different keys. See *Keyboard Commands and Remote Control via MIDI* on page 4 - 23.

Transposition

Another option in the sequence parameter box is transposition. First select all sequences either by choosing **Edit > Select All** or by pressing 🔲🔲.

The sequence parameter box in the top left should now look like this:

Instead of showing the sequence name the top line now shows the number of selected sequences.

You will notice asterisks next to some parameter values. This means that these parameters are set differently in the selected sequences.

Right now we are more interested in the *Transpose* parameter. Click the point shown in the diagram and use the mouse as slider.

When the number "2" appears release the mouse button. Start the sequencer and you will immediately hear the difference. The whole song has been transposed down by one semitone.

EMAGIC

Lo9ic

It may be easier to play a solo in this key. You can always transpose the song back again (if only it was this easy with a singer!).

Altering the Display

On small screens you often need more space for the actual working area of the window. By choosing **Uiew > Hide/Show Parameter** you can remove/restore the whole parameter area on the left.

The zoom of the display can be altered using the two telescopes in the top left corner of the window. The telescope with the downwards-pointing arrow is for vertical zooming and the one with the right-pointing arrow is for horizontal zooming.

Click either telescope at the small end to shrink the display or at the large end to enlarge the display.

Try experimenting with the telescopes for a while.

You can move the window section in the usual way using the scroll bars on the right and lower edges of the window.
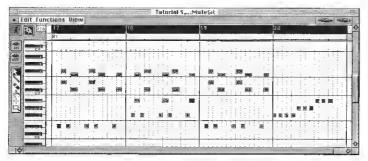
Editing Notes

LOGIC has various Editor windows for editing notes.

Matrix Editor

The display of the Matrix Editor is very similar to the Arrange window. The difference is that individual notes are displayed instead of sequences.

Select the "MuteGit" sequence in song part B1. Then open the Matrix Editor by choosing **Windows > Open Matrix Edit...** or pressing ⌘⑥. It should look something like this:

On the left side you will see a vertical keyboard indicating the pitch of the notes. At the top is the familiar bar ruler where you can also set cycle regions.

The note beams can be edited in practically the same way as the sequences in the Arrange window:

- Making selections,
- Moving,
- Copying (moving with the 🔳 key held down),
- Altering the length (grab at the bottom right corner, you can use the index finger tool to adjust just the length),
- Adding notes (with the pencil tool you can preset the length and velocity of added notes by clicking a "model note" first).

In addition the velocity is indicated by a horizontal line and by the color.
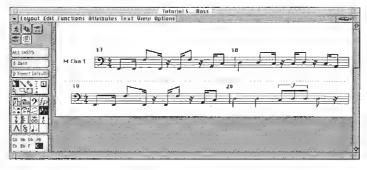
- You can use the crosshair tool (with the mouse as slider) to alter the velocity of the notes.

For length alteration the **Functions** menu also contains two specialized functions; **Note Overlap Correction** (shortens the selected notes by enough to remove any overlaps) and **Note Force Legato** (lengthens the selected notes so that each one sustains right up to the beginning of the next, creating a legato effect).

Score Editor

The Score Editor displays notes in normal notation. It not only allows you to edit MIDI notes but also offers many functions for preparing a musical score.

To open the Score Editor double-click a sequence or choose **Windows > Open Score Edit...** .

The diagram shows the "Bass" sequence from the song part "B1".

Score Style

The basic parameters of the note display are defined by the *Score Style*.

If you click the display parameter box at the point shown a flip menu opens where you can choose from the most common styles. *Bass* and *Treble* refer to a stave with a bass or treble clef. *Piano* refers to the usual piano notation in two staves. You can alter the score style by double-clicking.

When you record a sequence the score style defined in the bottom line of the instrument parameter box will be chosen automatically:

If *Auto* was set here (as shown) a suitable score style will be selected based on the recorded notes.

Key Signature

To enter the correct key signature, first click the sharp/flat sign in the part box as shown.
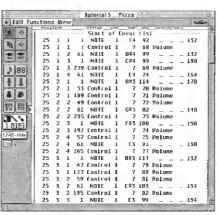
Below is a selection of all the keys. Grab the correct key and drag the mouse to the beginning of the stave.

You can alter the clef by double-clicking it.
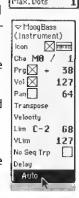
Event List

The Event List shows all the recorded events, not just the notes.

Open the Event List by double-clicking the "Pizza" sequence in song part B3.
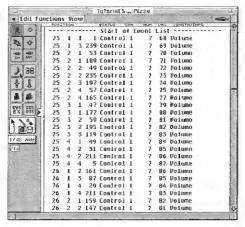
This sequence contains not just notes but also control change events with the number 7. These control the volume of the pizzicato violins.

On the left are several buttons which allow you to remove the various event types from the display. Click the button in the top left with the note symbol on it:

Immediately the display of the note events is removed.

- Select all visible events by pressing ⌘Ⓐ (select all).
- Delete the controller events with the ⌫ key.

Now restore the display of the note events by clicking the note button again. The sequence will then contain only note events.

By clicking the button with the pencil (or with any tool while holding down the ⌘ key) you can add an event of the relevant type at the current song position.

For example, this button stands for program change events.

You can alter every detail of every recorded event in the event list (using the mouse as slider).

To select several events with the rubber band you have to begin drawing out the frame in the status column, otherwise in the other columns you will alter the parameter values instead.

You can alter the values of many selected events simultaneously without loosing their relations. If you want to change further while a value "bumps into" its range limits, push ⇧. To bring all parameters on the same value hold ⇧ and ⌥.

To remove all selections click *-Start of Event List-* or *-End of Event List-*.

3.3 Second Round Trip

Arranging

To alter the layout of the tracks move the mouse near to the track number. The mouse pointer turns into a hand which you can then use to grab the track and move it vertically to a new position in the track list.

🖐	Bass	
2	Synth	
3	MuteGit	
4	Brass	
5	Pad	

1	Synth	
2	MuteGit	
3	Brass	
🖐	Bass	
5	Pad	

To remove a complete part from a song or add more (empty) bars use the cut/insert time functions. Refer to *Adding or Removing Passages* on page 6 - 52.

Alias

If you want to use the same sequence at several points in the song you can create aliases of this sequence. When you move the sequence instead of holding down just the 🔳 key as you do with normal copying, hold down both the 🔳 and 🔲 keys. An alias appears with the name in italics. It always follows the original sequence even if this is altered. For details see *Aliases* on page 6 - 39.

Folder

Turn on the solo function in the transport window. Now double-click the beam labelled "Drums" near the front of the tutorial song.

You are now in a folder containing the bass drum, snare and hi hat sequences. If you start LOGIC in this song section you will be able to hear all the drums in solo.

In this folder you can carry out practically all the same functions as in the arrange level, such as recording.

The bar ruler shows the start and end of the folder. If the loop sequence parameter is switched on in a folder the repeats stretch to the end of the folder, even if you alter the folder length at the arrange level.

To return to the higher arrange level double-click the background.

Here you can treat the folder almost like a sequence, i.e. cut it or alter its length, etc. Folders allow you to gather together associated groups of sequences from any tracks to make the arrangement clearer.

For more details on folders see *All About Folders* on page 6 - 36.

Markers

Markers have already been mentioned in the crash course in conjunction with setting a cycle, but markers do far more than describe the song section in the bar ruler. You can use them to write things at specific song positions in a specialized marker text window.

You can also use markers as named locator positions in the marker list window. Switch to Screenset no. 4 in the Tutorial Song (by pressing the ④ key in the main block of the computer keyboard) and start playback.

To the right of the Arrange window you will see the Marker List window. containing the names of the markers from the bar ruler. Click one of these markers. The song position immediately jumps to the relevant marker.

Now switch on the cycle function. If you click the markers in the Marker List window you will see how the markers can be used to store locator positions.

For details on markers see *Markers* on page 6 - 42.

Trash

All sequences which you have deleted while editing a song are not actually thrown away but are collected in LOGIC's own wastebasket. You can open this wastebasket by choosing **Structure > Trash > Open Trash**. You can drag the sequences from here back into the Arrange window. For details see *Retrieving Deleted Sequences* on page 6 - 11.

Quantization

You already know how to quantize a sequence and revert to the original.

If you require different quantization grids in different sections of a sequence just cut the sequence and set the desired grid in each sequence. If you then join the parts back up again the different quantizations will be retained.

Choosing **Functions > Sequence/Instrument Parameters > Fix Quantize** fixes the quantized positions, i.e. these are stored instead of the original positions (see *Fixing the Quantization* on page 6 - 29).

For details on quantizing notes see *Quantization* on page 6 - 26. For details on quantizing other event types see *Event Quantization* on page 8 - 11.

Grooves

It is possible to define the timing of a particularly successful recording as a quantization grid in its own right, which means you can quantize other sequences to it (see *Your Own Quantization Grid (Groove Template)* on page 6 - 30). With LOGIC Audio it is even possible to adopt the timing of an audio file such as a drum loop, as a quantization grid.

Recording Without a Metronome

If you don't want to record to a metronome, e.g. because your piano solo composition contains many tempo changes, just switch off the metronome while recording.

However, if you want to:

- Use the quantization functions on the recording,
- Have a correct display of the bar positions in the Editors, or
- Prepare a musical score,

you need a timing reference.

In this case you can use the reclock function to create a tempo track which fits your freely recorded sequence. This allows the timing grid to be adapted to the recorded notes. Refer to the *Setting the Tempo After Recording (Reclock Song)* on page 16 - 12.

Configuring the System

LOGIC allows you to tailor many aspects of the operation to your personal requirements and working style:

- You can activate practically all LOGIC's functions via either a menu command, key command or MIDI event. You can define the keys or MIDI events yourself in the key commands window (see *Keyboard Commands and Remote Control via MIDI* on page 4 - 23).
- You can save different window assignments and call them back up again (see *Screensets* on page 4 - 16).
- You can determine the program's basic operating modes in a multi-page dialog window called "Preferences" by choosing **File > Preferences.** These settings are automatically saved and are independent of the loaded song (see *Preferences* on page 14 - 23).
- You should also have a look at the song-related settings by choosing **File > Song Settings.** Like the Preferences, many of these options are self-explanatory. If in doubt refer to the *Song Settings* on page 14 - 1.

Environment

As soon as you are familiar with LOGIC's basic operation you should read chapter *The Environment* on page 7 - 1.

With LOGIC's Environment you can:

- Give external devices a virtual user interface with knobs, sliders (faders) and text displays

- Make note assignments for drum programming (see *Mapped Instruments* on page 7 - 18)

- Create arpeggios and MIDI delays (see *Arpeggiator* on page 7 - 30 and *Delay Line* on page 7 - 34)

- Use Touch Tracks to mimic the ability of an analogue sequencer to start sequences "live" at the press of a button

The Environment also gives you control of the whole MIDI signal flow inside your computer. This allows you to automatically change the signal path (Cable Switcher), or transform Midi events in realtime (Transformer).

That's all folks

You have now covered all LOGIC's basic functions. If you start creating your own songs your confidence with LOGIC will only increase.

We are certain that LOGIC will give you good service for many years to come, and we wish you and your music much luck and success!

Chapter 4
Using LOGIC

This chapter summarizes LOGIC's operating functions which apply in all windows.

But first, a quick word about this manual.

4.1   Conventions Of This Manual

Menu Functions

Menu functions are written in this font: **Function**.

If the text is dealing with functions which can be reached via hierarchical menus, the different menu levels are described as follows: **Menu > Menu entry > Function**.

Key Commands

If a function can be operated by a key command of the same name, you will see this symbol at the side of the text. If names differ, or if a function is only available as a key command, its name will be printed like this: *Key Command*.

All LOGIC's key commands can also be accessed via MIDI commands (for more on this, check out the section *Keyboard Commands and Remote Control via MIDI* on page 4 - 23).

Options and Parameters

The options you can set from the Preferences or Song Settings, and the parameters in dialog boxes are printed like this: *Parameters*.

Different parameter values are printed like this: *Parameter value.*

Detailed Explanations

Sometimes, detailed explanations will be given for things which you don't necessarily need to know about to understand how to work LOGIC. These are printed in this smaller font.

4.2   The Mouse

Basic functions

Clicking

Place the mouse pointer on the object (button, input field, etc.) and press the mouse button once.

Double-clicking

The same as clicking on an object, but you press the mouse button twice in quick succession.

Grabbing or Clicking and Holding

The same as clicking on an object, but you keep the mouse button held down.

Moving or Dragging

Grab the object and move the mouse (keeping the mouse button held down) to the desired position.

Mouse Input

Checkboxes

Checkboxes are square boxes which become "checked" when you click them to activate an option (or function). Click them again to remove the "check" and deactivate the option.

Pull-down Menus

Pull-down menus sometimes open when you grab certain input fields or buttons. You choose a command by moving the mouse onto the desired item. If you want to choose an item which is outside the visible section,

- move the mouse over the top or bottom edge of the menu; the further you move it, the faster you will scroll through the menu.

- hold down the ⌖ key as you do this. You can then let go of the mouse button and use the scroll bar on the right of the pull-down menu to scroll through it. When the mouse reaches the entry you want, release the ⌖ key.

Mouse as Slider

You can set practically all the numerical parameters (even note values or names) by grabbing the parameter value and moving the mouse up or down. If the parameter is made up of several separate numbers (e.g. song position) you can adjust each number individually.

Using the Mouse for In/Decrementing

All the parameter values which can be set using the mouse as a slider (and even some of the flip menu parameters) may also be increased or decreased in single units by clicking on the top or bottom half of the value while holding down the ⌃ key.

Numerical Input

Double-clicking on a numerical parameter value opens an input field. The previous value appears pre-selected (ie. highlighted) to allow it to be overwritten by a new entry. You can also use the mouse to make a partial selection in an input field, so that only part is overwritten (for more on this, see the section *Numerical Value Input* on page 9 - 6). As long as the input field is open, all the keys may be used for inputting data only and not for key commands (the exceptions are the main menu functions).

... by arithmetic

At any time, you can enter numbers by typing in an arithmetical operation, eg. "+2" or "-5", which then simply changes the current value by that amount.

... as ASCII-symbols

You can also input numbers as ASCII symbols: just put a ` or " in front of it, and the ASCII code will be input as a number. For example:

"! gives 33   Beipiel
"a gives 97

This function is particularly good for entering text in SysEx strings.

Text Input
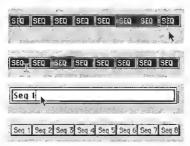
You input text names in the same way as numbers, but you only have to click the name fields once to allow input.

Numbered Names

As you might expect, you can give a number of selected objects the same name. If the name ends in a number, the number will automati-

cally be raised by 1 for each object. This allows you to name all the sequences on one track or all the faders in the Environment quickly.

Avoiding Numbered Names

To turn off the automatic numbering, place a space after the number at the end of the name. All the selected objects will then end in the same number.

Tools and the Toolbox
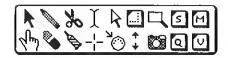
LOGIC allows recorded data to be handled in graphic form. This means that you don't have to carry out operations by inputting commands via number tables, but rather by editing graphic elements.

When editing objects graphically you always have two tools available at the mouse pointer position: one is already active, the other is activated by holding down the ⌘ key.

You change the currently active tool by clicking on the toolbox. The mouse pointer then adopts the shape of the tool you click on, so that you can tell what its function is by looking at the symbol: the eraser is used for deleting, the scissors for cutting and the glue tool for merging objects.

Below is a diagram of an artificial toolbox containing all LOGIC's tools. Since you don't need all the tools in all the windows, the toolboxes in the various windows always contain an appropriate selection of the tools displayed here.

upper row:	lower row:
pointer	hand
pencil	eraser
scissors	glue tool
text marker	crosshair
layout pointert	MIDI Thru tool
size tool	voice splitter
magnifying glass	camera
Solo	Quantize
Mute	Velocity

Effective Range of the Tools

• Tools are effective only in the working area of the window (you can define individual tools for each opened window).

• A tool basically affects the objects you click on. If the clicked object is already selected, the tool operates on all the selected objects.   *Important*

Concealing/revealing the Toolbox

The Toolbox can be hidden in the Arrange and Score Editor windows to save space, which can be very helpful if you only have a small monitor. The function is **Uiew > Hide/Shoω Toolbox**.

Opening the Toolbox at the Mouse Position

Use *Show Tools* (default: ⌫esc⌫) to open a toolbox at the mouse position.

Selecting Tools

You select the tool you want to use by clicking on it in the toolbox ((or clicking whilst holding down the ⌘ keyfor the alternative tool).

If a toolbox is opened at the mouse position you can also use one of the number keys to choose a tool at the corresponding position. The tools are always numbered from left to right and top to bottom. Press the Show Tools key twice to switch to the pointer and close the box.
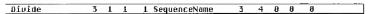
Moving to the Next Tool

Use *Set next Tool* and *Set previous Tool* to switch to the neighboring tool in the top window.

Info Line

When operating many of the tools an info line appears at the top edge of the window as long as the mouse button is held down. This info line provides useful feedback about the type of operation you are performing.

During operations involving arrange objects, the line will look something like this:

Divide	3	1	1	1 SequenceName	3	4	0	0	0

From left to right, the readouts are : operation, mouse (or arrange object) position, the arrange object name,the track number, and the length of the arrange object.

During operations involving events, the line looks something like this:

Length Change	1	1	1	1	NOTE	1	C1	70	1	0	0	0

From left to right, the readouts are : operation, mouse (or event) position, the event type, the event MIDI channel, the first data byte (ie. the pitch for notes), the second data byte (ie. velocity for notes), and for notes, the length of the note.

The Tools

Pointer

The pointer is the default tool. The mouse also takes on this shape outside the working area when you are choosing from a menu or inputting a value. Within the working area the pointer is used for selecting (by clicking on objects), moving (by grabbing and dragging), copying (by holding down the 🔳 key and dragging) and editing lengths (by grabbing the bottom right corner and dragging). Grabbing and dragging anywhere in the background opens a rubber band (see page 4 - 19).

Pencil

The pencil is used to add new objects. You can also select, drag, and alter the length of objects.

Eraser

The eraser deletes clicked objects. When you click on a selected object all of the currently-selected objects are deleted (as if you had used the ⌫ key).

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4

Text Mark

The text mark is used to name arrange objects or add text to a musical score.

Scissors

The scissors are used to split arrange objects, e.g. before copying or moving individual sections.

Glue Tool

The glue tool is the opposite of the scissors: all selected objects are merged into a single object, which is given the name and track position of the first of the objects on the time axis.

Solo Tool

Grabbing with the solo tool allows you to listen to all selected objects in solo during playback. Moving the mouse vertically also outputs any events you touch, even when the sequencer is stopped.

Mute Tool

Clicking on an object with the mute tool stops it from playing and makes a dot appear in front of its name to indicate that it is muted. You can unmute it by clicking it again. With a multiple selection the setting of the object you've clicked on applies to all selected objects.

Magnifying Glass

The magnifying glass allows you to zoom in on a "rubber-banded" section, right up to full window size. You revert to normal size by clicking on the background (for mpre on this, see the section *Zooming Selectively* on page 4 - 11). You can also access this function via other tools by holding down the ⌃ctrl⌃ key.

Hand

The hand is used in the Matrix Editor to alter note lengths, and, in the marker list window to jump to the markers and position the locators there at the same time.

Crosshair

The Crosshair is used in the Hyper Editor to input a linear series of parameter values.

MIDI Thru tool

The MIDI port assigns the instrument clicked on in the Environment to the selected track in the Arrange window, thereby making it the active MIDI Thru instrument.

Layout pointer

The layout pointer is used for moving objects in the Score Editor to op-
timize the display (e.g. bars to lines: "Local Formatting") without alter-
ing the actual MIDI events.

Size Tool

The size tool is used to adjust the size of graphic elements in the score;
for this reason, it looks similar to the bottom right corner of a Mac win-
dow, which is also used for resizing.

Voice Splitter Tool

You can separate polyphonic voices onto different staves in the Score-
Editor by drawing a dividing line with the voice separation tool, provid-
ed you have a polyphonic score style.

Camera

You use this tool in the Score Editor to outline and export sections of
the display as graphics files.

Quantize Tool

You use the Q tool in the note editors (the Matrix und Score editors,
that is) to quantize notes to the most-recently set value.

Velocity Tool

In the note (ie. Matrix and Score) editors), you can use the V tool to
change the velocity of notes.

4.3   Window Functions

The basic functions of the LOGIC windows are the same as those in oth-
er Macintosh application programs. However, the display options in
LOGIC's windows are far more extensive.

In LOGIC, you can open different combinations of windows (even sev-
eral of the same type) and adjust each one individually. All open win-
dows in a song are constantly updated. This means that the window
sections can follow the song position and you can see the alterations
that you make in one window having an effect in all the other windows
of your display. It is also easy to save different window arrangements
(called "screen sets") and recall them at the push of a button.

Working with windows

Opening windows

All LOGIC windows can be opened via the **Windows** main menu. After each menu item you are given the relevant key command (e.g. *Open Arrange* ⌘⃣7⃣9⃣) which allows you to open the window without using the mouse. You can open as many of the same type of window as you like.

Every time you use the **Windows** menu have a quick look at the key commands - that way you will soon learn them all by heart. You may also define your own personal key commands.

Tip

4

Closing windows

You close windows (⌘⃣7⃣) by clicking on the close symbol in the top left of the windows. If you hold down the ⌥⃣ key as you click, all the windows of the active song will be closed for you. Hitting the ⌥⃣ key again closes all the windows of all the songs currently loaded.

Moving up one level in the display hierarchy

Clicking the close box in the line below the main window close box takes you to the next highest display level. The close box in the line below takes you to the next-highest level of the display (for more on this, read the section *Changing Display Levels* on page 6 - 38.).

Setting window size

You adjust window size by pulling the lower right-hand corner of the window, as with any window in the Finder.

Maximising window size

The widening symbol in the upper right corner of the window toggles the window between its maximum size and the size it was before you clicked on the symbol (**Windows > Zoom Window** oder ⌘⃣/⃣).

Selecting the Working Area

Scrollbars

The scroll bars are situated at the right and bottom edges of a window, if you can only see one section of the working area in a vertical or horizontal direction.

You can move the visible section by clicking the arrows or grabbing and dragging the scroll box. There are two points of note:

- The size of the scroll box in relation to the size of the entire scroll bar corresponds to the size of the visible section in relation to the overall size of the window,
- the visible section changes when you move the scrollbox.

X/Y Element

The X/Y element is situated in the bottom left corner of the window. By grabbing and dragging it you can move the horizontal and vertical window section, as if you were dragging both scroll bars simultaneously.

Page Scrolling

Use the key commands *Page Up, -Down, -Left* and *-Right* to scroll one page up, down, left or right, as if you had clicked in the grey region above / below the vertical scroll bar or to the left / right of the horizontal scroll bar. The key commands *Page Top, -Bottom, -Left most* and *-Right most* take the visible section of the working area to the top, bottom, left or right, just as if you had grabbed one of the scroll bars and moved it to one of its extreme positions.

Scrolling to selected objects

In the Arrange, Event List, Hyper and Matrix Editors, **View > Scroll to Selection** allows you to move the window section to the first set of selected events. This function is available as a key command from the »Various sequence editors« area; the key command works in the currently-active window.

Zooming

The telescope-shaped zoom symbols in the top right of the window are used to zoom in and out of the working area display. Clicking the left, smaller side of the telescope symbol reduces the size of the objects in the display allowing you to see more objects in the same space (zoom out) and clicking the right, larger side enlarges the objects in the display (zoom in).

The telescope with the downwards-pointing arrow is for vertical zooming (*Zoom Vertical In/Out,* default assignment: ctrl ⬆ / ctrl ⬇), while the one with the sideways-pointing arrow handles horizontal enlargement (*Zoom Horizontal In/Out,* default assignment ctrl ⬅ / ctrl ➡). In some

Logic

windows, only one telescope is available, and this then handles both horizontal and vertical zooming at once.

During zooming the top left selected object is kept in the visible region as far as possible.
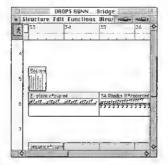
Storing and Recalling Zoom Settings

You can store three different zoom settings for each window using the key commands *Save as Zoom 1-3*. Use *Recall Zoom 1-3* to call them back up. These commands always apply to the top window only.

4

Zooming Selectively

Zooming In On One Section of the Screen

To enlarge a section of the screen to the size of the whole window use the magnifying glass to drag a "rubber band" over the section you want. You can do this several times in a row.

Reverting to the Previous Zoom Setting
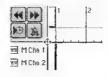
Click on the background with the magnifying glass. This allows you to return to the original zoom setting by backtracking through all of the zoom "steps" you have used up to now.

You can call up the magnifying glass functions with any other tool (apart from the pencil) by holding down the ctrl key.

Window Elements

Adjusting the Size of the Window Elements

If you move the mouse over the top left corner of the arrange area the mouse pointer turns into a crosshair. By dragging it, you can now adjust the size of the bar ruler, arrange area, track list and transport buttons. You can also adjust the window elements in the Score, Hyper and Matrix Editors using the same method.

Concealing/Revealing the Transport Functions

Use **Uiew > Show Transport** to display or remove the transport panel buttons in the top left corner of the Hyper, Matrix or Arrange windows. The number of buttons and indicators depends on the amount of space available (see the section *Adjusting the Size of the Window Elements* on page 4 - 12).

Concealing/Revealing the Parameters

The function **Uiew > Show Parameters** (*Hide/Show Parameters*) allows you to display or remove the entire area on the left of the Arrange, Environment, and other Editor windows: the area which contains the sequence and instrument parameters, and the toolbox . Hiding these parameters gives you more space to work in.

In many windows, you can hide and/or reveal further screen elements, such as the toolbox: these display options are always available from the **Uiew** menu.

Menus

Because of LOGIC's great range of functions, most of them are not found in the main menus, but appear as local menus in the menu bars of the LOGIC windows where they are required.

Hierarchical Menus
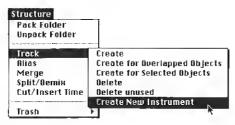
You use the menus (whether main or local) in the same way as in other application programs: grab the menu title, move the mouse over the desired item and release the mouse button. In hierarchical menus, there is a right-pointing arrow after the item. If you keep the mouse over this item, a submenu drops down on the right. To choose an item

from this submenu, move the mouse to the right into the submenu, and then vertically over the desired item. Then release the mouse button.

In this handbook, this kind hierachical menu selection will be written out as follows (say): **Structure** > **Track** > **Create New Instrument**.

Fixed key commands

Some menu functions can be accessed via fixed keystrokes or combinations of keystrokes. The keys (or combinations thereof) are shown on-screen next to the menu entries and are operate globally. For example, you can open a song with ⌘⟨O⟩, or copy one to the Clipboard (=Copy) via ⌘⟨C⟩.

Please note that you may assign practically any other function to any key you like using the Key Commands window.

Menu options with "..." in their title

Three points, like these... next to the menu function title indicate that the entry does not activate a function straight away, but instead opens a dialog box.

Dialog Boxes

In Dialog boxes ,you can hit the thick-bordered screen switch by pressing the ⟨⏎⟩ key, as well as by clicking with the mouse.

Window Types

There are two different types of window in LOGIC: normal windows and float windows. The contents of all the windows belonging to the current song are always updated, no matter what the type of window.

Normal Windows

You can open as many normal windows as you want, including several of the same type. Even though the contents of all the windows is constantly updated, only one of the windows ever has the status of being the "top" or "active" window. This is the window which is in the foreground when several normal windows are overlapping.

Top or Active Window

This window can be recognized by its fully-shaded title list. The main distinguishing characteristic of this window is that key commands only affect this window, and not any of the others. **Windows > Next Window** (⌘⑦) brings the next window forward if it is fully covered up by others. A background window is activated by means of a short click, which may also contain a function (no click is required to activate the background).

Background Windows

You can watch alterations taking place here and by clicking and holding undertake almost any type of editing without having to bring the window into the foreground. Background windows are characterized by a white title bar (they can be positioned *next* to the top window, not just tiled underneath it). You bring the window into the foreground by clicking on it, clicking on the title bar or calling up one of the local menu functions.

Float Windows

Float windows are so called because they always "float" in the foreground, even above the top normal window (if there are too many open float windows, they will inevitably cover each other up – just click on them to bring them to the front). Float windows are recognizable by their narrower title bar, which contains no name. Mouse operations can be carried out in the same way as in normal windows.

The most often-encountered example of a float window is the Transport window. However, you can open any other window as a float window by holding down ⌥ when you open the Windows menu.

Relationships Between Windows

The two buttons in the top left of a window (shown here) determine its relationship to the song position (Catch) or to other windows (Link, Show Contents or Contents Catch).

Catch

The Catch function means that the visible section of a window follows the song position as the song plays through.

If the button with the walking man on it is pressed in (ie. if it is blue), the window's display follows the song position as the song plays. If the button is not pressed in, the display stays put, even when the song position line disappears off-screen (*Catch Clock Position*).

Automatic Catch Disabling

If you move the visible section manually, Catch is automatically switched off, so that the new section you have chosen doesn't then disappear off-screen with the song position line.

Autocatch

The function *Enable Catch when Sequencer starts* (**File Preferences > Global**) always switches on Catch mode whenever you press play or pause.

Link, Show Contents and Contents Catch

You can define these display options for every window which bears some relation to the window where you are about to make selections.

Link

When the button with the chain link icon is activated (ie. when it is pink) this window always displays the same contents as the top window. The display is adjusted whenever the selection in the top window is altered.

Here's an example: imagine the top window is an editor. In Link mode, the other editor windows can display the same data in another form (though please remember: you cannot have any event display as the background window of an Arrange window in Link mode).

Here's another example, using the Environment window. The top window is the Arrange window. In Link mode, the Environment window moves the instrument for the selected track into view.

Show Contents mode

Double-clicking on the link button activates Show Contents mode. This means that the window always shows the contents of the object selected in the top window. The display is therefore always one level below that of the top window.

Here's an example of this: if the top window is an Arrange window, in Show Contents mode the editor windows can show the events of a selected sequence.

You could also use Show Contents mode in an Arrange window to display the contents of the folders in another Arrange window.

Contents Catch

By simultaneously switching on Catch and Show Contents, you activate Contents Catch mode. Initially, this is equivalent to Show Contents mode, but when the song position reaches the next object on the same track, the contents of *this* object are then displayed.

You could use this mode in an Arrange window, much as you would Show Contents mode. The editor windows would then show the events of the sequence which is currently being played on a track.

Screensets

Normally you will lay out your windows manually on the screen in a way that suits your way of working. This layout of all the windows, with all their various parameters (display, zoom, relation between all the individual windows) is called a screenset, and can be stored. You can then swap between different screensets, much as you might swap between different computer monitors.

Storing Screensets

Screensets are numbered from 1 - 99 using only the numbers 1 - 9. You can see the number of the current screenset in the main menu next to the word **Windows**.

You don't have to save screensets with an explicit command. It happens automatically as soon as you switch to another screenset. Thus without you doing anything, your current working situation is always stored on the current screenset.

Switching Screensets

Just input the number of the desired screenset (1 - 9). With two-figure screensets hold down the [ctrl] key (at least while inputting the first number).

Protecting Screensets

Use the key commands *Lock/unlock current screenset* to protect the
current screenset from being altered. A • then appears in front of the
screenset number. Repeat the key command (for which the default is
⌘L) to unlock the screenset.

The *New Song* command deactivates all Screenset locks.

Copying Screensets

To copy the current screenset onto a destination screenset, hold down
⌂ when you switch screensets.

Copying Screensets between Songs

Close all the windows want to copy in the screenset, switch to the other
song, and reopen the editors. They will have retained their sizes and
shapes in the new song.

The reason for this is that the preset values for window position, size,
and all other pertinent parameters are stored in memory when you
manually close a window, so that the settings remain the same the
next time windows of the same type are opened again.

Reverting to a Stored Screenset

The command *"Revert to current screenset"* resets your screen to the
way it was when you called up the current screenset.

Sequencer-controlled Switching

You can automatically switch screensets using meta event no. 49 - just
add it to a sequence in the Event Editor.

- Set the song position to the desired switch point.

- Hold down the ⌘ key and click in the Event Editor on the button
  shown. The inserted meta event has the default value 50 (*Song Se-lect*).

- Alter the number in the *NUM* column from 50 to 49. This changes
  the name to *Screenset.*

- Input the desired screenset number in the data byte column (*VAL*).

You can stop the switching by muting the sequence that contains the
Meta 49 event.

Other Functions

The **Windows** > **Tile Windows** function tiles all the open windows on the screen, and makes them all the same size. The **Windows** > **Stack Windows** function piles all the open windows on top of one another in such a way that at least a part of the title bar is visible for each window, no matter which is the foreground window at the time.

4.4   Selection Techniques

Whenever you want to carry out a function on one or more objects, you have to select the object(s) first, ie. give them editing status. This applies to arrange or environment objects and individual events alike. Selected objects are displayed in inverse colours or flash (the latter in the Score and Hyper editors).

The selection status of an object applies in all windows, ie. an object selected in one window will also be selected in another window. Changing the top window doesn't affect the selection (as long as you don't click on the background, as this deselects everything: instead, try clicking on the window's title bar).

Selecting Individual Objects

Individual objects may be selected by clicking on them, and deselected by clicking in the background or by selecting another object.

You can also use the key commands *Select next/previous Object* which does exactly what it says (default: ⊟/ ⊟, in the Event List: ⬇/ ⬆). *Select first/last* selects the first/last object in the current display level.

Selecting Alphabetically

The ⊟ key selects the next alphabetical object. In the Arrange or Environment windows pressing any letter key selects the first alphabetical object beginning with this letter (as in the Mac's Finder) providing there is no key command assigned to this key.

Selecting Several Objects

To select several objects which are spread out, hold down ⬧ as you click them. This also works with horizontal or rubber band selection.

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Use the key commands *Toggle next/previous Object(Event)* to select the following/previous object (or event) as well (default: ⌧⊟ / ⌧⊟).
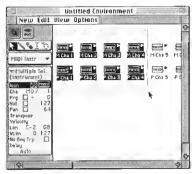
Horizontal Selection

To select all objects on a track, click on the track name in the track list. In the same way, you can select all events with a certain event definition in the Hyper Editor, by clicking on the event definition name, or all notes of a certain pitch in the Matrix Editor by clicking the relevant key on the screen keyboard.

In Cycle mode, this selects only the events within the Cycle zone.

"Rubber-Banding"

To select objects which are close together, click on the background and drag a so-called rubber band over them.

All objects touched or enclosed by the rubber band will be selected.

Toggling the Selection Status

When you make any selection (including by rubber band or horizontal selection) if you hold down the ⌧ key at the same time, the selection status of the object(s) you are selecting is reversed.

You can reverse the selection status of all objects using **Edit > Toggle Selection**. For example, if you want to select all objects apart from a few, first select these few and then choose **Toggle Selection**.

Selecting Following Objects

To select all objects after the current one (or, if no object is currently selected, to select all objects after the song position), choose **Edit > Select all following**.

Selecting Objects within the Locators (Vertical selection)

Edit > Select inside Locators selects all objects lying wholly or partly within the locator limits.

Deselecting Objects outside the Locators

Edit > Deselect Outside Locators deselects all objects outside the locators: objects within them remain unchanged.

In the Score window, this command works on whole sequences as well as events.

This command is particularly useful after using the *Select Equal* or *Select Similar* commands, to restrict the commands' effects solely to the region between the locators.

Deselecting Objects outside the current Track

The *Deselect All Objects Except Recording Track* key command deselects any objects not on the currently-selected track.

This command is especially handy after other special selection commands, to ensure that the commands' effects are restricted to the recording track only.

Selecting Empty Objects

Edit > Select empty Objects selects all empty objects.

Selecting Overlapping Objects

Edit > Select overlapped Objects selects all overlapping objects.

Selecting Similar or Identical Objects

If you have selected an object you can use the function **Edit > Select Similar Objects** to select all similar objects and the function **Edit > Select Equal Objects** to select all equal objects.

The table shows what counts as similar or equal:

Object	Similar	Identical
Controller Event	Controller# equal, any data byte	Controller# and data byte (control value) equal
Note Event	Note equal, any octave	Note and octave equal
Environment Object	Same object type (e.g. fader)	Same fader type (e.g. text)

If you want to delete all similar objects, select one of these objects and choose *Delete similar Objects*.

Conversely, if you want to keep all similar objects and delete all the other objects in this sequence, choose *Delete but keep similar Objects*.

Selecting all Objects

To select all objects, select **Edit > Select All** or press ⌘Ⓐ.

Deselecting All Objects

You can deselect all objects by clicking on the background or using the key command *Deselect All*.

4

4.5   Edit Operations

The local edit menus in LOGIC's various windows all take the same form. The first item is Undo, below that are the well-known universal clipboard functions, and at the bottom of each are the main selection commands.

Undo

Undo allows you to reverse the previous edit. In the Global page of the Preferences, you can remove the warning message that appears when you activate Undo by placing a cross next to *Disable safety alert for Undo*.

The key command for Undo is always ⌘Ⓩ.

The Clipboard

The clipboard is an invisible area of memory into which you cut or copy selected objects so that you can paste them back in a different position.

The clipboard spans all songs, which means you can use it to exchange objects between different songs.

Cut

All selected objects are removed from their current position and placed on the clipboard. The previous contents of the clipboard are overwritten in the process (key command ⌘Ⓧ).

Copy

A copy of all selected objects is placed on the clipboard. Here too, the previous contents of the clipboard are overwritten (key command ⌘C).

Paste

All objects on the clipboard are copied into the top window. The clipboard is not erased in the process (key command ⌘V).

The contents of the clipboard are added at the current song position (if they are events or arrange objects). The song position is moved along by the length of the pasted objects.

In the Arrange window, the contents of the clipboard are pasted on the selected track. If events are added on the Arrange level, either a new sequence is created for them, or the events are added to a selected sequence.

Any objects that existed previously are unchanged.

In the Environment window, the objects are pasted into the layer currently being displayed, at their original position.

Clear

Any selected objects are erased. Clear has no effect on the clipboard and is the same as pressing the ⌫ key.

Delete and Select next object

This key command erases the objects currently selected in the Arrange and Editor windows, and selects the next object.

Paste at Original Position

This function works in a similar way to Paste, but the objects on the clipboard are always pasted to the position they were cut from, irrespective of the current song position (which is where the objects would be placed with the ordinary Paste function).

Paste Replace

This function only works in the Arrange and Editor windows, and again, resembles Paste, except that with Paste Replace, all existing events are replaced by the objects being pasted.

Logic

When using this function, all the arrange objects or events that lie within the time period occupied by the objects on the clipboard are erased.

This effect of this function can be carried out by using two of LOGIC's other functions in combination, one after the other: first a normal *Paste* and then (in the Arrange window) *Replace Overlapped Objects* (or in the Editors) *Erase Unselected Events within Selection*. This gives you the option of retaining some of the old objects by manually selecting them by hand before carrying out the second of the functions.

Tip

4

4.6   Keyboard Commands and Remote Control via MIDI

You can activate nearly all LOGIC's functions via key commands or MIDI messages. The Key Commands window is where you assign key commands to the keys or to MIDI messages.

Whenever this manual mentions a key command, this refers to a command which can be called up by either a key or a MIDI message. This allows you to completely customize LOGIC to suit your own working style.

Important!

If any function described in this manual is also available via a key command with the same name you will see this symbol.

Your personal key assignments are stored (together with the settings of the Preferences pages) in a file called »LOGIC Preferences« in your Macintosh's System folder (in the *Preferences* folder, to be precise). You should:

*   make a backup of this file at another location on your hard disk;

*   make a floppy disk backup of it in case you need to use a LOGIC system on another computer.

When you install updates to your version of LOGIC, your personal key commands will, naturally, remain unaltered.

Special Keys
Some keys have special functions:
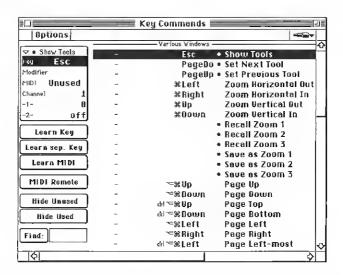
*   The modifier keys ⇧, ctrl, ⌥, and ⌘ can only be used in conjunction with other keys.

- The backspace key (⌫) has the fixed function "delete selected objects". It can only be assigned a function in conjunction with the modifier keys ⇧, ⌃, ⌥, and ⌘.

- The key combinations assigned to the options in the main menu bar cannot be reassigned.

- The ⊕ and ⊖ keys increase or decrease any selected parameter value in single units. However, they *can* be assigned different functions which overwrite this function.

- The keys ⊣,Ⓝ,Ⓜ,Ⓑ,Ⓐ,Ⓢ,Ⓓ,Ⓠ,Ⓦ,Ⓔ,Ⓡ have invisible predefined functions for step recording, which can also be overwritten if you choose to redefine them .

Key Commands Window

The Key Commands window can be opened by selecting **Windows >
Key Commands**.

All the available key commands are listed on the right side. They are grouped according to the following points:

- Global commands
- Functions affecting all windows (various windows)
- Functions affecting all Editor windows (various sequence Editors)

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- Functions for the Arrange window
- Functions for the Environment window
- Functions for the Score Editor (Score window)
- Functions for the Event List Editor (Event window)

A dot in front of the description of the function indicates that the function is only available as a key command or MIDI command. To the left you can see the currently-assigned key, and even further to the left the assigned MIDI message. A dash here indicates that no assignment has been made.

Assigning a Function to a Key

- Click the *Learn Key* button.
- Select the desired function with the mouse.

  `Learn Key`
- Press the desired key, if necessary together with the desired modifier key(s) (⇧, ⌃, ⌥, and ⌘).
- If you want to make another assignment, repeat steps 2 and 3.
- Deactivate *Learn Key*!

You can also set the key (*Key*) and the modifier via pull-down menus in the parameter box (top left).

Learn Separate Key

Learn Separate Key works in the same way, but differs in that it's not just a reference to an ASCII code that is stored, but the actual code of the key that is pressed.

`Learn sep. Key`

In practice, this means that you can, for example, assign different commands to the number keys on the numeric keypad than to the ones on the number keys on the main part of the keyboard — and the same goes for the different "+" and "-" keys on the numeric keypad and main keyboard. The only disadvantage is that the key code (a number) is displayed in the Key Commands window instead of the ASCII symbol, which is more useful for reference purposes.

Assigning a Function to a MIDI Message

- Click the *Learn MIDI* button.

  `Learn MIDI`
- Select the desired function with the mouse.
- Send the desired MIDI message.
- If you want to make another assignment repeat steps 2 and 3.
- Deactivate *Learn MIDI*!

If you want to assign a Note On message, remember to switch off *Learn MIDI* before you release the key in question (and thereby transmit a   Hint

Note Off message). The assignment is always made to the last message received.

You can set the type of message, the channel and the first and second data bytes in the Parameter box via pull-down menus or using the mouse.

Deleting Assignments

- Click on *Learn Key*, to erase the key assignment, and/or *Learn Midi*, to erase the MIDI-assignment.
- Use the mouse to select the function whose key or MIDI assignment you want to delete.
- Press ⌫.
- To erase more assignments, repeat the second and third steps.
- Deactivate the *Learn Key* and/or *Learn MIDI* button.

Switching MIDI Remote on/off

MIDI Remote | You can use the MIDI Remote button to globally switch on/off response to all defined MIDI messages. The MIDI command for this (*Toggle MIDI remote*) is the only one which is independent of the status of the remote control, and is therefore always available.

Tip | If you have assigned MIDI Remote commands to all the keys on your master keyboard, you are advised to use a second foot pedal or a programmable button on your keyboard for *Toggle MIDI Remote* which you cannot accidentally press while you are recording. If nothing like this is available, use a key you are unlikely to press by accident (for example the lowest or highest key) — but be aware that you will no longer be able to use that key to record any notes!

Disable MIDI Remote switches off MIDI remote control.

Checking the Function of a Key

Deactivate *Learn Key*, and press the key whose function you want to check. The function will be automatically selected and displayed in the middle of the window.

Making the Display Clearer

Hide Used
Hide Unused | You can use the *Hide Used* and *Hide Unused* buttons to remove all the used or unused key commands.

All the other Key Commands window functions remain available for you to use.

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Finding Key Commands

Due to the large number of possible key commands, it can sometimes be difficult to find a particular key command. For this reason, LOGIC offers a *Find* function, which lets you search for a key command by typing in its name (or a part thereof!).

Simply click on the white space to the right of the *Find:* button and enter the string of characters you're searching for. The window will then display only those key commands containing that character string (plus the selected command, even if it doesn't contain that string).

The Key Commands window remains active, even in Find mode; you don't have to leave this mode to continue making assignments.

The Find function is not case-aware (ie. large and small letters are not distinguished).

The *Hide Unused* and *Hide Used* buttons work in combination with Find, but obviously, this means you must switch off both in order to see *all* the commands that fit the search criteria, irrespective of the commands' current assignment.

The *Find:* button switches Find mode off and on. The button is automatically activated if someone enters a string of characters.

Printing a Key Command List

The **Options > Copy Key Commands to Clipboard** function copies the key commands into the MacOS clipboard as text. From here, it's a simple matter to paste the results into any word processor, format them any way you want, and print them out.

The *Copy to Clipboard* function also stores the *Hide* and *Find* function settings. You could, therefore, export only a certain group of key commands (eg. all those containing a particular character string). What you see is exactly what's exported.

Storing Key Command Assignments

The assignments you make are stored in the Preferences file automatically when you quit the program. However, you can also store your key commands manually, via **Options > Save Preferences**. This also stores all the other Preferences setting as well.

Importing Key Assignments

This function is particularly useful if you need to work temporarily on someone else's system; you might wish you could use your personal key assignments on it, but without altering the system settings.

The Key Commands window function **Options > Open Key Commands...** allows you to import the key assignments from any »LOGIC Preferences« file via the usual file selection box, which you could set to look at a floppy disk containing your personal »LOGIC Preferences«-Datei).

The Preferences file in the System folder that has been inuse up until now changes its name to »Logic Preferences.bak«. This file contains the old keyboard commands.

You don't (hooray!) have to restart LOGIC to continue.

Initializing Key or MIDI event assignments

The **Options > Initialize > ...** command either initializes key assignments (**... > Key Commands**), or MIDI assignments (**... > MIDI Commands**). The preset assignments are then used again.

Watch Out!   Please be aware that you will lose your own key command assignments if you haven't created your own copy of the »LOGIC Preferences« file!

4.7   Global Functions

Defining Colors

In the Arrange, Marker Text and Environment windows you can define a color for selected objects (or symbols). **View > Object Colors** (*Open Object Colors*) opens a color palette containing 80 colors. Selecting the key command a second time closes the palette.

Click on the color you want to fill in all the selected objects in that color. Double-clicking on one of the 80 "preset colors" opens the familiar Macintosh color wheel, where you can create your own color palette. Please remember that your Macintosh needs to be able to display 256 colors for these functions. You should be careful when altering the color palette in 16-color mode because this could affect the colors of other objects.

Newly-recorded sequences acquire their Instruments' colors. The **View > Instrument Colors to Objects** function colors all the selected sequences the same color as your track instrument.

This could be particularly useful if you begin to find many sequences are ending up on tracks *other* than the one on which they were recorded — because of the need to copy sequences from track to track, etc.

The background color for a Marker Text window (click and hold down the ⌘ key on the color you want) also appears in the bar ruler (see also the section *Defining Colors* on page 4 - 28).

Online Help

LOGIC has an online help facility: the file in question, »LOGIC Help« is automatically installed, and needs to be in the same folder as LOGIC. The »Active Help« system extension is also required (supplied built-in with all Macs since System 7.1).

If the "Active Help" extension is on, and you hit the 'Help' key on the Mac's extended keyboard, LOGIC will give you an introduction and pointers to detailed instructions in the printed manual.

We're working on a detailed online Help utility for all of LOGIC's functions right now. Stay tuned!

4.8   Song Administration

All events, other objects and settings (apart from the Preferences and key commands) are components of a song. Songs are handled in the main **File** menu.

New Song

When you first start up LOGIC, it opens a preset standard song. After just a short time, you will have learnt how to make your own adjustments to the Environment, to screensets and to song settings, and will no doubt want to keep these settings for use in future songs, as they are suited to the way you personally work with LOGIC. The best way to do this is to set up your own 'default song', and save it in the same folder as the LOGIC program, calling it »Autoload«.

Autoload Song

If there is a song in the LOGIC folder called »Autoload«, LOGIC will automatically load it when it is booted up. When you're ready to start work on a new song, simply save the Autoload somewhere else under a new name using **File > Save as...** and begin. This file can then form the basis for your new song.

Creating a new Song

If you select **File > New** (⌘N), LOGIC checks to see if an »Autoload« song is available and opens it automatically if it is. If not, a new default song is created. If an »Autoload« song *is* available, you will be asked if another copy of the Autoload song should be made (to avoid accidentally erasing it) or if a completely new default song should be created.

Opening Default Song

If you hold down the ⌥ key while selecting **File > New**, a new default song called 'Untitled' will be opened. You can also use the key command ⌘⌥N to do this.

Stationary Pad

The stationary pad is a standard option in the Macintosh operating system. You convert a document (e.g. a LOGIC song) into a stationary pad by opening the Info window and placing a cross next to *Stationary pad* (to open the Info window for a selected document in the Finder, choose **File > Information** or ⌘(i)).

When you open a stationary pad song it is immediately renamed »Untitled« to prevent it being overwritten the next time you save.

Tip   If you want to use different basic settings you can place several stationary pad songs in the Apple menu.

Tip   You can also convert the Autoload song into a stationary pad song, or use the *Locked* option to prevent the file being accidentally overwritten.

Loading a Song

You use **File > Open** (⌘O) to bring up the familiar file selection box. If there is already a song loaded, you will be asked if the currently-loaded song should be saved (select Close or hit ⏎) or not (select Don´t Close). You can switch off this question so you don't get irritated by be-

4

ing asked every time: select **File** > **Preferences** > **Global** > *When Opening o song, osk to close current song(s)?* .

Different songs open at the same time

If you have several songs open at once, you can switch the currently active song from the **Windows** menu – the active song is the one marked with a tick.Provided the **File** > **Preferences** > **Global** > *Hide Windows of inoctive songs* option is switched off, you can also switch the active song by clicking on one of the other song windows.

Special Functions

Importing settings from other songs

The Environment function **Options** > **Import Settings** allows you to import various settings from other songs (and the key command *Import Settings* may be used globally, not just in the Environment window). These settings include:

- Screensets
- Transform Sets
- Hyper Edit Sets
- Score Instrument Sets
- Score Styles
- Score Settings (all Song Settings, whose pages begin with »Score:«, eg. Numbers & Names or Clefs & Signatures...)

If you select the Import Settings... command, a dialog box will appear, and you can select the settings you want individually.

For example, to import only the Screensets from a given song, select only that particular option.

Click on *Import*, or hit the ⏎ key.

If only one song is currently loaded, a file selection box will open so that you can select the song to import the settings from.

The file selection box will not appear if several songs are already loaded; instead, the settings from the song that was active before the current one are imported automatically.

Checking/repairing Songs
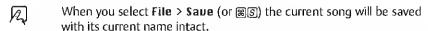
If you double-click on the display on the Transport which shows the remaining number of free events (see page 5 - 7), the memory will be

reconfigured. At the same time, the current song will be checked through for any signs of damage, structural problems and unused blocks.

If any unused blocks are found — which shouldn't happen — you will be able to remove these and repair the song.

Saving Songs

When you select **File > Save** (or ⌘⑤) the current song will be saved with its current name intact.
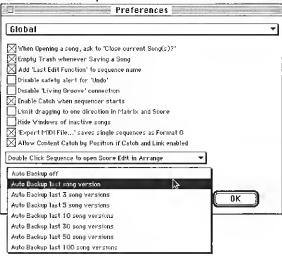
If you don't wish to overwrite the last version of this song saved under this name (which is what will happen if you just use **File > Save** or ⌘⑤), try using **File > Save As...**. Here, you can enter a new name for the song (and select a new directory or even create a new folder). The next time you save using straight **Save** (⌘⑤), the new name and file path will be used.

Automatic Backup Files

When you save a song LOGIC will first make a safety copy of the previous file. You can switch off this function in the global preferences (**File > Preferences > Global**) , and also set there the number of backup files that will be made — up to 100!

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This function allows you to store up to 100 earlier versions of your song, thereby retaining a complete record of your song's development.

The backup files will be saved in a folder with the same name as the song, but with the filename extender ».bak«. This backup folder will be placed in the same folder as the original song. The backup files themselves will have the same name as the song, too, but will be sequentially numbered. For example: if the song is called »My Song«, the backup folder will be »My Song.bak«, and the backup files within the folder will be called »My Song01«, »My Song02«, and so on.

4

If you want to know what the latest version is, take a look at the contents of the folder in the Finder, making sure you sort the contents of the window by date (select 'By Date' in the Finder's View menu with the backup folder open and selected).

The Finder cannot distinguish between more than one file if they were saved during the same minute.   Note

Reverting to the Saved Version

If you made a mistake at your last key press, you can reverse it by selecting **Edit > Undo** (⌘Z).

If you have accidentally deleted large parts of your song, but not noticed until *after* you have carried out the next key press (which renders Undo useless), you should still be able to retrieve the deleted sequences and folders from the trash.

If you have made some *really* serious blunders (surely not!) or you decide that over the last 15 minutes since you last saved, your creative outpourings have resulted in material too unpleasant to describe here politely, you may find the function **File > Revert to Saved** very helpful. This replaces the current song with the previously saved version.

Closing a Song

File > Close (⌘C) closes the currently active song. If you have made any changes since the last time you saved, LOGIC will ask you if the song should be re-saved before closing to preserve the changes you have made.

Close Window or Song

If you have more than one window open in a song, the key command *Close Window or Song* will close only the uppermost window of the song and not the whole song. The song will only be properly closed

when the last song window is too. The default key command for this is ⌥⌘W.

Note   You can override the default ⌘W key command by reassigning it in the manner described earlier in this chapter. If you try this, you will be warned: "This Key Command is used in the Main menu". If you ignore this message (click »OK« or hit ⏎), you will be able to reassign the key command without any more interruptions.

Quitting the Program...

Choose **File > Quit** (⌘Q) to leave the program. If you have not yet saved your last changes, you will be asked if you want to do so before quitting (press ⏎ to save).

...without saving the Song
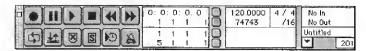
The key command *Close Song without Save* closes the currently- active song without saving it first — and you will *not* first be asked if you want to save. We put this command in because we were asked to by so many experienced LOGIC users. Please only use it if you know what you're doing...

EMAGIC

Chapter 5
Transport Functions

5.1 The Transport Window

The Transport window is used to control and display the recording and playback functions.

Being a float window, it is always in the foreground, and can never be covered by other windows. As an alternative to the horizontal Transport window shown above you can open the vertical Transport window shown below. This has normal status, and can be covered by other windows.

Opening the Transport Window

To open the normal (horizontal) Transport window, press ⌘⑦ or select **Open Transport** from the **Windows** main menu. To open the vertical Transport window, hold down the ⌦ key when choosing the same menu item.

Closing the Transport Window

Unusually, the top bar of the horizontal Transport window is located on the left, with the close box at the top.

The Transport Bar in Other Windows

There is a third way of using the transport functions in the Hyper and Matrix Editors, and the Arrange window. When you choose **View > Show Transport**, the transport bar functions appear in the top left corner. The number of visible buttons and displays depends on the size of the area available, which you can adjust by grabbing and dragging the bottom right corner as shown in the diagram.

In this chapter, the horizontal transport will be used for examples rather than the vertical one.

Altering the Display

To move the Transport window around the screen either grab it by the left edge anywhere in the gray area, or near the song name (right side, bottom half).

The Transport window pull-down menu opens when you click on the symbol on the bottom right (shown here). This is where you change the way the Transport window looks.

Smaller/Larger

You can adjust the size of the Transport bar to several different size settings.

Legend

This display option conceals/reveals a description of all the window elements, and is very helpful if you are still getting to know the program.
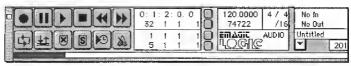
Position Slider

This hides/shows a stripe at the bottom edge of the window whose size represents the current amount of the song shown on screen relative to the entire song length (read the section *Song End* on page 5 -

Logic

9). You can also grab the stripe and move it quickly to take you to a different song position.

5

SMPTE View Offset

This allows you to display a different SMPTE time for the start of your song, irrespective of the true SMPTE start time being read from external time code. There's more about this in the section *SMPTE View Offset* on page 16 - 28.

Giant SMPTE Display/Giant Bar Display

This converts the Transport window into a large display of the current SMPTE time or current bar position.
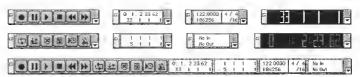
You can switch back to the normal display via the "downwards arrow menu" or open a second Transport window.

Sections in the Transport Window

The following options let you conceal different parts of the Transport window independently. This in turn allows you to control the size of the Transport window.

- Control Switches Display(Play, Stop, Rewind...)
- Mode Switches Display (Cycle, Autodrop...)
- Position Display
- Locator Display
- Tempo/Signature Display
- MIDI Indicator Display

It many parts are used together, the individual elements are displayed horizontally next to one another. Thi s allows you to use a very narrow Transport window.

The **smaller, larger** commands are used as you would expect. When you switch to:

- Giant SMPTE Display or
- Giant Bar Display

the whole window is used for the giant display of either the SMPTE time or the bar display. This gives you a free hand in size and shape of these displays.

All Elements Horizontal

Achieves the same effect as if you had selected all the display sections, one after the other: a very narrow transport bar.
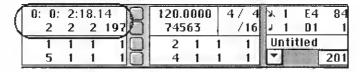
All Elements Normal

This restores the usual kind of transport.

Parameter Fields and Displays

All the displays in the Transport panel (apart from the s ong name) can be used for inputting data. You can either input the numbers via the keyboard after double-clicking on the display field, or adjust the individual numbers using the mouse as a slider.

Position Display

The current song position is shown in two formats:

Above: SMPTE time.

Hours : Minutes : Seconds : Frames / Subframes.

For more on setting the song Start time when using external SMPTE sync, please read the section *Setting a SMPTE Offset* on page 16 - 27. You're also shown here how to enter a Display Offset independently of the start time.

Below: bar position

Bar - Beat - Division - Ticks.

A beat corresponds to the denominator in the time signature, a division is a freely-definable part of a beat (see section *Time Signature and Divisions* on page 5 - 7). A tick is the smallest possible bar subdivision or system quantization — just 1/3840 note.

Using an option on the **File > Preferences > Display** page, you can change the Bar Position display considerably:

- Have dots as dividers
- Have the tick counter operate from 0, not 1
- Leave out the division value

The following possible options give you an impression of the end result:

```
Clock Format  1  1  1  1
Clock Format  1. 1. 1. 1
Clock Format  1  1  1  0
Clock Format  1. 1. 1. 0
Clock Format  1  1     1
Clock Format  1. 1.    1
Clock Format  1  1     0
Clock Format  1. 1.    0
```

Buttons

To the right of the position display are two small buttons. The first time you click on them both, set the song position to the start of the current bar, and the second time you click them to the song start or start of the cycle region (in cycle mode).

The upper switch opens a Marker list window. This can prove useful if you are just using markers as namable means of storing locator positions. For more on this, read the section *Marker List Window* on page 6 - 47.

Locators

You can define two sections of a song by setting position locators at the beginning and end.

0: 0: 2:18.14		120.0000	4 / 4	⋊ 1	E4	84
2 2 2 197		74563	/16	♩ 1	D1	1
1 1 1 1		2 1 1 1		Untitled		
5 1 1 1		4 1 1 1		▼		201

The locators on the left define the cycle region, which is a passage that can be constantly repeated (take a look at the section *Cycle Mode* on page 5 - 14).

The locators on the right define the autodrop range (take a look at the section *Autodrop* on page 5 - 11). They are only displayed when the cycle and autodrop functions are both switched on.

Any mention of the left or right locators is a reference to the left-hand cycle locators. The top one is the left locator and the bottom one is the right locator.

Switches

On the right of the cycle locators are two placement buttons. When you click on either of the buttons, the song position jumps to the relevant locator (*Goto Left / Right Locator*).

Conversely, clicking on them while holding down the ⌘ key places the selected locator at the current song position (*Set Left / Right Locator by rounded Song Position*).

Finally, clicking on the locators while holding down the ⇧⌘ keys prevents any rounding to the nearest bar (*Set Left / Right Locator by Song Position*).

Tempo

0: 0: 2:18.14		120.0000	4 / 4	⋊ 1	E4	84
2 2 2 197		74563	/16	♩ 1	01	1
1 1 1 1		2 1 1 1		Untitled		
5 1 1 1		4 1 1 1		▼		201

The tempo is given in quarter notes per minute or beats per minute (bpm). In LOGIC it ranges from 0.5 to 9999 bpm and is given to 4 decimal places.

Programming Tempo Changes

Please refer to the section *Tempo* on page 16 - 1.

EMAGIC

Free Memory

0: 0: 2:18.14	⬭	120.0000	4 / 4	♪ 1	E4	84
2 2 2 197	⬭	(74563)	/16	♩ 1	01	1
1 1 1 1	⬭	2 1 1	1	Untitled		
5 1 1 1	⬭	4 1 1	1	▼		201

Below the tempo, you can see the amount of free memory (given in free events). You can get more free memory in the following ways:

* By reconfiguring the memory. If you double-click on the free memory display, you get the question "Reconfigure Memory?". Confirm with ⏎. This reorganization is also carried out automatically after saving or loading a song. A good use of this feature is to free memory after closing a song if two or more songs have been open at the same time.

* Choose **Structure** > **Trash** > **Empty Trash** before you reconfigure the memory.

* Quit the program (**File** > **Quit**), select LOGIC's program icon, and in the Finder, choose **File** > **Get Info** (⌘ℐ). In the information box increase the *Preferred size* in the bottom right by a few hundred kilobytes. The next time you start LOGIC will have more memory available.

* If there is still not enough memory when you start LOGIC, quit any other application programs before you start again. If necessary reduce the *Preferred size* slightly.

* If none of this helps, you should expand the memory in your Macintosh. Ask your computer dealer for advice.

Time Signature and Divisions

0: 0: 2:18.14	⬭	120.0000	4 / 4	♪ 1	E4	84
2 2 2 197	⬭	74563	/16	♩ 1	01	1
1 1 1 1	⬭	2 1 1	1	Untitled		
5 1 1 1	⬭	4 1 1	1	▼		201

This is where you can see and set the time signature of the song. The format is:

Bor numerotor/ Bor denominotor/ Division.
The division defines the third note value in all position displays (ie. in the Event Window), and forms the grid for various length and place-

ment operations. The division is normally set to 1/16 notes, and has a value range of 1/4 to 1/96 note. If the note value of the division is equal to or greater than the bar denominator, the third value of the position display is automatically removed.

The function *Select next higher / lower format* can be used to switch to the next highest or lowest division.

Programming Time Signature Changes

If you alter the bar numerator or denominator in the Transport window, a time-signature change is created at the start of the bar where the current song position is. This is shown in the bar ruler to the left of the bar number. Of course, a time change does not affect the absolute positions of the events that are already there.

You can also add time signature changes directly in the Score Editor. For more about this, take a look at the section *Time signatures and how to change them* on page 12 - 28.

Editing Time Signature Changes

Move the Song Position Line to the first bar with the particular time signature you want to change . Set the new time signature from the transport bar.

You can also edit the time signature in the Score Editor by double-clicking on it.

Erasing Time Signatures

Simply change the time signature back to the value of the previous time signature.

You can also erase time signatures in the Score Editor by selecting them and hitting the ⌫ key. To erase *all* time signatures, select **Edit > Select similar Objects** before doing this.

Copying Time Signatures between Songs

You can copy all time signature and key changes into the clipboard using the **Structure > Signatures/Keys > Copy All to Clipboard** command. These can then be pasted back into the current song using the **Structure > Signatures/Keys > Paste All from Clipboard** command. Existing time signature changes remain unchanged by this.

MIDI Monitor and Panic Function

The top line shows the last MIDI message received, and the bottom line the last MIDI message transmitted. The monitor is mainly used to check the MIDI connections.

```
0:  0:  2:18.14   |  120.0000  | 4 /  4 | ♪  1   E4   84
    2   2   2  197|     74563   |  /16 | ♩  1   D1    1
    1   1   1     1|      2   1   1   |   1 | Untitled
    5   1   1     1|      4   1   1   |   1 | ▼          201
```

Click on the MIDI monitor to silence any hanging notes. If this doesn't work, double-clicking on it should do the trick (*Full Panic*; take a look at the section *If notes stick* on page 6 - 57).

Song Title

The title of the active song is shown below the MIDI monitor.

Song End

```
0:  0:  2:18.14   |  120.0000  | 4 /  4 | ♪  1   E4   84
    2   2   2  197|     74563   |  /16 | ♩  1   D1    1
    1   1   1     1|      2   1   1   |   1 | Untitled
    5   1   1     1|      4   1   1   |   1 | ▼          201
```

Below the song title, on the right, you are given the position of the song end. As soon as the sequencer reaches this position it stops automatically except when recording, in which case the song end is automatically moved to the end of the recording.

For internal system reasons, the maximum length of a LOGIC song is 8550 quarter notes, or about 2138 bars in 4/4 time.

A song can therefore last a maximum of around 70 minutes at a tempo of 120bpm. At 95bpm the maximum length is over an hour and a half.

If you need to increase this length, e.g. for film synchronization, just halve the tempo. You can achieve the same result by using 4/8 time instead of 4/4 time, and treating quarter notes as eighth notes.

A 4/8 song at a tempo of 60bpm (equivalent to 4/4 at a tempo of 120) has a maximum length of more than 4273 bars or over 2 hours and 22 minutes.

Keys and Buttons

All the functions of the Transport panel are also available as keyboard commands, even if the Transport window is not open.

Transport

The basic functions of these keys are the same as on tape machines or cassette recorders and should be familiar to everyone. Here are a few special features.

Record

Recording normally starts after the count-in at the start of the next bar, and in cycle mode at the left locator. You can also choose to have one beat constantly repeated until a MIDI message is received, at which point recording begins (see also page 5 - 17).

Pause

Pauses recording or playback until you press pause or play again. During paused recording, you can add individual events which will still be recorded!

Play

Starts playback at the current position, or in cycle mode from the left locator.

Play from beginning always starts at the beginning of the song, *Play from previous bar* starts at the beginning of the previous bar, *Play from Selection* starts from the first selected object and *Play from Left Locator* and *Play from Right Locator* always start at the left or right locator, regardless of the cycle mode.

Stop

Ends recording or playback — the sequencer stops. If the sequencer is already stopped, pressing stop moves the song position to the song start, or in cycle mode to the left locator.

Play or Stop

This key command start or stops playback depending on the status when the command is used.

If you select the *Play* or *Stop* command twice in rapid succession, the Song Position Line will be moved to the beginning of the song (or cycle), just like hitting *Stop* twice.

This command is particularly helpful if you are using a Powerbook without a separate numerical keypad.

Rewind/Forward

If the sequencer is stopped, these work as normal. If the sequencer is running, you can monitor as you go (cueing/scrubbing), ie. the MIDI events are output faster (even when rewinding!). By dragging your

mouse to the left or right, you can increase or decrease the speed, or even reverse direction (keep the mouse button held down).

Both normal (*Rewind/Forward*) and fast (*Fast Rewind/ Fast Forward*) winding are available via the keyboard.

Mode

The mode buttons do not immediately trigger an action, but switch operating states. The activated mode is signalled by the relevant button being illuminated.

Cycle

Switches to cycle mode (see also page 5 - 14).

Autodrop

Switches to autodrop mode (see also page 5 - 19).

Replace

Switches to replace mode (see also page 5 - 18).

Solo and Solo Lock

In solo mode, only the selected objects are played. The data output from all other objects is muted. This is known as: "soloing the objects". You can, of course, change the solo mode of objects by changing what you have selected (if necessary, refer to the section *Selection Techniques* on page 4 - 18).

If you want to carry out specific functions on individual objects regardless of the solo'ed sequences (or folders) you have to be able to select these objects without affecting the solo status.

This is what the solo lock function is for: if you have soloed the desired objects double-click on the solo button, whose colours will then be inverted (as shown). You can now alter the selection without affecting the solo status of the objects.

Sync

This button allows you to synchronize LOGIC from an external source. If LOGIC is running by itself or acting as a synchronization source (ie. master) this button should not be activated. When you first boot LOGIC, Manual Sync mode is automatically switched off.

Grabbing the sync button opens a pull-down menu where you can define the following:

• the type of external synchronization (see also page 16 - 15),

- whether MMC commands should be transmitted by LOGIC via the Transport buttons, so that remote control of MIDIable tape machines is possible (see also page 16 - 15),

- direct access to the tempo editors (see also page 16 - 1).

Metronome
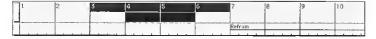
This button is used to turn the metronome on and off. LOGIC keeps a separate record of its setting for recording and playing back. Grabbing the button opens a pull-down menu where

- you have direct access to the **Recording Options** of the **Song Settings** (described on page 14 - 1),

- you can open an Environment window with a visible and selected **MIDI Metronome Click.**

5.2   Bar Ruler
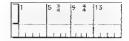
There is a bar ruler at the top of all the horizontal time-based windows (ie. the Arrange, Matrix, Hyper, and Score).

This ruler is used to display and set the;

- song position,
- start and end of the song or folder,
- cycle and autodrop locators, and
- markers (see also page 6 - 42).

Display

Depending on the zoom settings (page 4 - 10) the bars are shown at the top edge in units of 1, 4, 8 or 16. Changes in time signature are also shown here.

Logic

In the bottom third, there is a vertical line for each bar. The shorter lines represent one beat, but are not always visible (depending on the zoom setting).

For more on converting to SMPTE times, please read the section *Converting the Bar Ruler / Position Display to SMPTE Time* on page 16 - 30.

Start and End Markers

The song start is normally at position *1 1 1 1*. You can move the song start to an earlier position for playing upbeats or program change commands by grabbing and dragging it with the mouse. The position display in the top left of the window will tell you where it is. The song end (default: bar 201) can be set using the same method or via the numerical display (see page 5 - 9).

In folders, the start and end markers refer to the folder rather than the song. The length of a folder can therefore also be adjusted within the folder itself.

Song Position Line

The song position line (SPL) is a vertical line which indicates the current song position in all horizontal time-based windows. You can grab the line with the mouse and drag it to the desired position (but only if there is no object at the mouse position when you drag it). Choosing *Wide Song Position Line* in the **Display** page of the **Preferences** switches to a thicker SPL.

Direct Placement...

Since it is fairly difficult to grab the SPL in the window itself, you can also directly position it using the bottom third of the bar ruler. Just click here to make the SPL jump to the point you've clicked at.

...while starting or stopping

Double-clicking on the bottom third of the bar ruler repositions the SPL and also toggles between playback (or record) and stop.

...numerically

Choosing *Goto Position* (default key: ⬚) calls up the dialog box shown above to allow you to input the song position numerically. The lastdivision used (bar position or SMPTE time) is automatically selected with

---

the last input value as a default. Since the numbers are registered from the left, it is enough just to enter the bar number.

Placement at a Marker

If you have labelled a passage with a marker, clicking anywhere on the marker whilst holding down the ⌘ key positions the SPL at the start of the marker. If the sequencer is stopped, double-clicking it begins playback at the start of the marker.

Scrubbing

Start playback and grab the bottom third of the bar ruler. By moving the mouse to the left or right, you can now scrub through the song, ie. move the SPL and hear all the "cued" events. As soon as you stop moving the mouse, playback resumes as normal.

You can also do this using the *Scrub Rewind* and *Scrub Forward* key commands. The *Scrub by MIDI value (-2-)* command is designed to allow scrubbing via external MIDI control, but you can use any MIDI controller number. Data bytes over 64 scrub forwards and those under 64 scrub backwards.

5.3　Cycle Mode

In cycle mode, a chosen passage of your current song is constantly repeated. This is useful for;

*   composing part of a song,
*   practising a recording,
*   recording individual tracks consecutively, or
*   editing events.

The cycle region is shown as a black stripe in the top part of the bar ruler.

Switching On Cycle Mode

There are four ways of switching cycle mode on and off;

- clicking on the cycle button,
- using the *Cycle* key command,
- clicking on the top part of the bar ruler, and
- inputting graphically via the bar ruler.

How LOGIC behaves in Cycle mode

- The Song Position Line jumps from the end of the cycle region to the beginning;
- When this happens, playback from the Environment objects which are generating notes is interrupted;
- The Play command starts playback from the beginning of the cycle region;
- To start playback from another position, hit Pause twice, or Pause and then Play;
- At the cycle jump point, you can use the Chase Events function (of which more later) — **File > Song Settings > Chase Events >** *Chase on Cycle Jump*)
- You can determine the way recording works in cycle mode by using the various options on the **File > Song Settings > Recording Options** page (for more on this, take a look at the section *Recording in Cycle Mode* on page 5 - 19).

Defining the Cycle Region

Graphically using the Bar Ruler

- Drag a marker into the top part of the bar ruler (for more details, read the section *Markers and Locator Positions* on page 6 - 45).

- Click in the top third of the bar ruler, keep the mouse button held down, and drag the desired range.

- Grab the bar in the middle to reposition it.

- Grab the bottom corner to move the start or end points of the cycle (you can even do this while the sequencer is still running!). If you drag the lower left corner to the right until you pass the end point you can turn the old end point into the new start point. If you set the start and end points to the same position, cycle mode is switched off.

- You can reset the nearest edge of the beam by clicking on it while holding down the ⊡ key, even if the beam is outside the visible range, or if cycle mode is switched off.
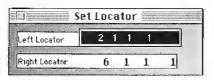
When you set the size of a cycle graphically in the bar ruler, your sizes are quantized to the nearest bar. The locator postions can only be changed division by division at high zoom resolutions or if you hold down the ⌷ctrl⌷ key as you drag. If you hold down ⌷⬆⌷and⌷ctrl⌷, at a really high zoom resolution, you can drag and change the size of the region in ticks.

Tip   To set locator positions that do not lie on whole bar lines irrespective of the zoom resolution, enter your locatorpositions numerically in the Transport window.

Numerical Entry

The positions of the left and right locators (start and end points of the cycle) are shown in the Transport window where they can also be altered.

There are also two keyboard shortcuts available (*Set Left / Right Locator*) to allow you to directly enter either of the points in the dialog box shown above (default = last input).

By Objects

You can use the key commands *Set Locators by Object(s)* and *Set Locators & Play* to set the locators at the start and end of selected objects; the latter command also starts playback.

Set rounded Locators by Object(s) rounds the position of the locators to the nearest bar.

Logic

The commands *Set rounded Locators & Play* and *Set rounded Locators & Record* achieves the same, while simultaneously starting playback or recording.

Set rounded Locators & Cycle Play and *Set rounded Locators & Cycle Record*, again, achieves the same, while simultaneously switching to cycle mode.

5.4   Recording

5

Choosing a Track

First you have to select the track you want to record on, for example by clicking on it (see also page 6 - 3). Remember that just one track is always selected, which can even be on another folder level (see also page 6 - 38). During the recording, the incoming events are stored in a sequence on the selected track.

Changing Tracks

You can change the record track without having to stop recording — just select a new track, for example via the *Select previous / next track* command (default keys: ⬆ or ⬇).

Count-in

After you press the record button the recording begins with a count-in. This is defined in the **Recording Options** page of the **Song Settings** in the bottom-most pull-down menu. The choice is:

No count-in	The recording begins without a count-in.
Wait for note	LOGIC repeats the first 1/4 note (or note value of the bar denominator) until a MIDI note is received. The recording then begins.
1-6 Bar count-in	There is a 1-6 bar count-in (default: 1 bar).
3/4 - 9/4 count in	There is a count-in of 3 to 9 quarter-notes. (These options are particularly handy for count-ins during time signature changes).

...Click only during count-in

If the **File > Song Settings > Recording Options** > *Click only during Count In* option is active, the click will be switched off after the count-in — so-called "Drummer mode".

This is often useful if the section of the song just before the part you're recording lacks the sort of rhythmical information necessary to play new parts in in time, but when there's plenty of rhythmic guidelines once the section you're recording in gets going.

Record Options

Record Toggle (default: ▭) switches between playback and record mode. *Record Repeat* repeats the recording from the previous drop-in point.

Record into selected sequences

Normally a new sequence is created during every recording. In the **Recording Options** of the **Song Settings** you can activate *Merge New Recording With Selected Sequences*, so that any new data are incorporated **into** an existing sequence when this sequence is selected.

Retrospective Recording

If you were playing a world class solo while the playback was running, but forgot to record – don't worry. Simply use the key command *Capture Last Take as Recording*. All events you played after the last change of the Song Position Line will belong to the recorded sequence – just as if you had recorded right from the start.

Replace Mode

To activate replace mode press the replace button. In replace mode any newly recorded data is always stored in a new sequence. In addition, any existing sequences on the destination track are cut at the punch in/out points of the recording, and any data between these points is deleted.

Destructive MIDI Recording (Merge+Replace)

If you select *Merge New Recording With Selected Sequences (r) and* switch on replace mode (the recording head symbol in the Transport window), the new events you record will replace the ones in existing sequences.

The Merge/Replace combination can itself be coupled with the Auto-drop and/or Cycle functions.

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Recording in Cycle Mode

All settings for recording in cycle mode can be made in the **Recording Options** of the **Song Settings** (see page 14 - 1). You can either use several cycles to record a single sequence (*Merge only New Sequences in Cycle Record* checked), or you can create a new sequence for every cycle (...unchecked). A new track can be automatically created for each of these sequences (*Auto Create Tracks in Cycle Record*). The sequences you create can also be automatically muted (*Auto Mute in Cycle Record*). This mode is very well suited to recording several consecutive versions of a solo and then picking the best one.

5

Cycle and Replace

During a cycle recording in replace mode, existing sequences are deleted during the first cycle, from the punch-in point to either a punch-out point or up to the end of the cycle. When the second cycle begins, recording continues, but no more sequences are deleted. If you want to replace the end of an existing sequence, you don't have to stop recording before the second cycle begins: the start of the existing sequence remains intact.
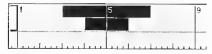
Autodrop

Autodrop means automatically going into and out of record at previously defined positions. Autodrop mode is most commonly used to rerecord a misplayed section of an otherwise-acceptable recording. The advantage is that you can concentrate on the playing.

If cycle is not active the left and right locators serve as drop-in and drop-out points. Autodrop is activated by clicking the autodrop button.

Defining the Autodrop Regio

If both cycle and autodrop are active, there is an independent pair of locators available for the autodrop. In this case, there will be two stripes in the bar ruler, the top one representing the cycle region and the bottom one the autodrop range. The autodrop beam can be graphically altered in exactly the same way as the cycle stripe. If the bar ruler display is very narrow, holding down the ⌦ key as you alter it will ensure that all your actions apply to the autodrop stripe. To activate auto-

drop graphically in the bar ruler, drag down the stripe while holding down the ⌦ key.

For graphical operations, the grid scale can be reduced to division resolution by holding down ⌃, and to tick resolution by holding down ⇧⌃.

Setting Autodrop Numerically

The positions of the autodrop locators are displayed numerically to the right of the cycle locators on the Transport window ; their position can be altered by changing the numbers from here.

Recording in Autodrop Mode

To carry out an autodrop recording, put the sequencer into record anywhere before the drop-in point. Any events which you play before the drop-in or after the drop-out are channelled through the sequencer as usual, but are not recorded.

Combining Cycle and Autodrop

If you want to improve a difficult part of a certain passage you can use a combination of cycle and autodrop. Cycle mode lets you practice as many times as you like before the "final take". Each time only the autodrop range is recorded. You can use the previous section to "get into the groove" (boy, you've got to prove your love to me.)

5.5   Chase Events

Chase Events is a function which searches all the sequences playing at a jump-in point. The function examines what all these sequences are doing *before* the jump-in point, to find out which events *would* be affecting playback at the jump-in point if it had been reached by playing through the song, rather than by just jumping there.

See if you can learn the last sentence by heart; it does wonders for getting rid of people you don't like at parties. This is a complex point to grasp, so here's another explanation of the problem:

If you start playback of a song in the middle, by jumping straight to that point (via Cycle mode looping or by direct placement), you might expect there to be problems with note playback; if an important note started playing just before the jump-in point, you would expect LOGIC to miss it, and the note would not sound. Notes are not the only potential problem; if there were a maximum pitch-bend message just before the jump-in point, playback would miss this out too. Fortunately, LOGIC is smarter than your average MIDI sequencer, as Yogi Bear almost said...

Open the **Chase Events** page in the **Song Settings** to set up the chase events function.

The function searches all the sequences playing at the jump-in point, looking before the jump-in for a selection of the following:

- any notes still due to be playing at the jump-in point;
- any notes still due to be playing at the jump-in because of a held-down sustain pedal (*Chase sustained Notes*);
- program changes;
- pitch-bend information;
- continuous controllers 0-15;
- continuous "switch"controllers 64-71;
- all other controllers (*all other Controls*);
- monophonic (channel) aftertouch;
- polyphonic aftertouch;
- SysEx data (the last SysEx message before the jump-in point is transmitted)

Special Note:

There is a potential problem with chasing notes that are being used to trigger a drum loop in a sampler. Unless you are lucky enough to start the sequence precisely at the beginning of the sample loop, the sample will be triggered at the wrong time and therefore play out of sync with the rest of the sequence (at least until the next trigger note). The problem is that most samplers can only play their samples from the beginning and cannot synchronize them to the beat by starting in the middle.

Well, here's how you solve that one:

Activate the *No Seq Trp* parameter of your drum loop instrument in the instrument parameter box and switch off *Chose Notes in No Seq Trp Instruments* in the **Chase Events** page of the **Song Settings**. The result is that whenever the song jumps to a new position, your drum loops will not play until they reach the next "trigger note".
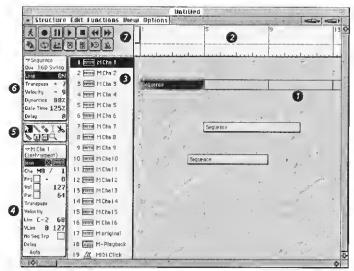
Note: The *No Seq Trp* parameter actually prevents transposition by the sequence playback parameters, which is also not desirable for drum sounds or loops.

Chapter 6
Arrange Window

6.1   Overview

The Arrange window is the heart and "home base" of LOGIC. Study it closely because it is the "face" of the program that you will see most often when you're composing your next world hit!

6

The arrange area ❶ is where all MIDI information is recorded on horizontal **tracks**. Individual MIDI or audio recordings are called **sequences** and are displayed as beams. Above the arrange area is the bar ruler which allows you to work out the position of any track's sequences within the song ❷.

To the left of the arrange area is the track list ❸. This is where you determine which **instrument** should play the MIDI or audio information on each track . You can make various settings for the instruments in the instrument parameter box ❶ in the bottom left corner.

Because the sequences are arranged graphically, you can also use specialized mouse tools from the tool box ❾ to help you perform different operations.

The sequence parameter box ❿ is where you set the playback parameters for the individual sequences such as transposition and **quantization**.

In the upper left corner is the transport panel ❼ which is functionally almost identical to the Transport window.

Opening the Arrange window

The Arrange Window can be opened by selecting **Windows > Open Arrange** in the main menu, or by using the keys ⌘⑦.

6.2   Tracks

Each individual track is stretched horizontally across the arrange area and the different tracks are stacked vertically. A track is where the notes and other MIDI events are recorded.

In the track list all the tracks are numbered from top to bottom. During playback a small "level indicator" appears over each track number. This shows the velocity data of the recorded notes and shines red for a maximum velocity value.

To the right of this is where you assign an **instrument** to the track, which will be represented by an icon and a name.

The instrument determines which sound generator or audio instrument plays the MIDI events or audio data on the track. For more information, refer to section *Instruments* on page 6 - 6.

Strictly speaking, this doesn't have to be an instrument because **you can assign any environment object to a track**. The track data could therefore be sent to a fader object or directly to a MIDI port. However, since you will normally define instruments in the track list we will use the term "instrument" instead of "track data destination object".

Generally, only **one** track can be selected at any one time. (The acception is with LOGIC Audio,where it is possible to select one audio and one MIDI track simultaneously.) During a recording, a sequence is created on this track containing the recorded MIDI events or audio data.

Selecting a Track

You select a track by clicking its name or icon in the track list. This also selects all objects on the track (if the Cycle function is switched on, it only selects the objects within the cycle region defined).

Use the *Select Next/Previous Track* function to select the track above/below it in the track list (key command: ⬇ / ⬆).

Changing tracks without changing selection already made

If you click on a new track whilst holding down the 🔳 key, the track will be selected without changing the existing selection of sequences and folders.

Creating tracks

6

To create a track, use the **Structure > Track > Create** command. The new track is created at the same position as the track currently selected, and all the tracks below it are moved down accordingly.

To create a track at the bottom of the track list double-click in the track list below the lowest track (*Append Track to Track List*).

The new track always has the same instrument setting as the selected track. If you hold the 🔳 key, the track will get the next instrument of the instrument list.

Creating special kinds of tracks...

... for overlapping objects

The function **Structure > Track > Create for Overlapped Objects** creates new tracks for wholly or partly overlapping objects. The objects are distributed on these tracks so that no more overlaps occur.

... for selected objects

Use the function **Structure > Track > Create for Selected Objects** to create new tracks for all selected objects. The objects then appear on these new tracks. Only one new track is created for all selected objects which were on the same track.

Deleting Tracks

To delete the selected track, use the **Structure > Track > Delete** function. If there are any objects on the track a safety message appears first.

If there is no object selected in the arrange area you can perform the same function by pressing the ⌫ key.

A third method is to grab the track as if to reposition it (see below) and remove it from the track list by dragging it to the left.
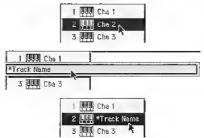
Deleting Unused Tracks

Choose the **Structure** > **Track** > **Delete Unused** function to delete any tracks that don't contain any sequencers or folders.

Naming tracks

To name a track irrespective of the name of the instrument, select **Structure** > **Track** > **Create Trackname**.

Alternatively, you can change the name of an existing track by double-clicking on the instrument name in the track list while holding down the ⌘/ctrl key, and typing another in the text input field that appears.

The track name is then displayed in place of the instrument name in the track list and will be used as the default name for recorded sequences.

If there is vertically enough room (provided by zooming in vertically), both track and instrument name will be displayed.

You can see the instrument name in the instrument parameter box, or check it by clicking on the track name and holding down the mouse button.

Name while creating a track

You can immediately name a new created track by holding the ⌘-key.

Deleting track names

To delete a track name, select **Structure** > **Track** > **Delete Track-name**.

Alternatively, you can double-click on the track name whilst holding down the ⌘ key. This opens the text input field for the track name. The name can be deleted using ⌫. The instrument name will then appear in the track list again.

Repositioning Tracks

To change the position of a track in the track column, grab the track by its number and pull it to its new position.

6

Muting tracks

If you move the mouse by the left edge of the track column, next to the track numbers, the mouse pointer changes into a mute tool (an "M" for "Mute"). If you click here, the track you're next to will be muted (or the existing mute will be removed, depending on what state the track is in when you click).

Alternatively, you can use the key command *Mute Track* to mute entire tracks.

Muted tracks are indicated by a • .

Muting all tracks...

If you hold down the ⌘ key while clicking in the left-hand side of the track column, all tracks in the currently-selected display level (or folder) are muted together (or if they were already muted, they will be unmuted).

Alternatively, you can use the command *Mute All Tracks of Folder.*

... with the same instrument (Mute Instrument)

If you mute a track while holding down the ⌘⌥ keys, all the tracks in the current song with the same track instrument (including those in all the folders) are muted.

This can also be achieved by using the keyboard command *Mute All Tracks with Same Instrument.*

Selecting an Instrument

By clicking on an instrument's name (or icon) in the track list and holding down the mouse button, you open a flip menu. This is where you select other instruments.

Changing Instrument

If you hold down the ⌥ key while selecting an instrument, the previously selected instrument will be replaced in every track in the current song by the new instrument (even in tracks in folders).

Selecting track instruments by "Drag & drop"

You can select any of the objects in the Environment window to be the current track instrument by simply dragging one out of the Environment window into the track column.

If you move a multi-instrument into the track column, the selected subchannel is set as the track instrument. If no sub-channel is selected, all initialised (i.e. those not crossed out) sub-channels are set for the destination track and the tracks below that. If there are no tracks below the destination track, some will be created.

In all cases, the Environment objects concerned are completely unaltered.

Special Types of Instrument

In addition to the normal instruments which are described in the section *Instruments* on page 6 - 6, there are two other possible track settings for which there is no corresponding Environment object.

No Output

This mutes the output of all data on the track.

Folder

This setting is used when you want the track to play a folder (see also page 6 - 36). **Normal sequences will not play on a track set to the Folder instrument**.

6.3 Instruments

In order to know **where** specific MIDI messages are to be sent LOGIC needs to have some idea of its environment, i.e. its MIDI devices. This is portrayed graphically in the Environment window which shows the

Logic

sequencer together with many other objects, e.g. instruments. Each instrument is therefore an Environment object representing a physical MIDI instrument. You can think of the instrument object as being a virtual instrument, or a representation of a real instrument.

To find out how to give LOGIC all the necessary information on its environment refer to page 7 - 1.

If you double-click on the instrument name in the track list, this directly opens an Environment window where that object will be selected.

Creating a New Instrument

If possible you should do this in the Environment. However, if you are in a hurry, use the function **Structure > Track > Create New Instrument**. The selected track will then contain a new instrument whose parameters can be adjusted in the instrument parameter box. This instrument will also be created in the Environment.

6

The Instrument Parameters

The instrument parameter box is situated in the bottom left corner of the Arrange window.

The instrument parameters are not track parameters, so if you alter the parameters here it will affect all tracks playing that instrument.

The instrument parameter box in the Arrange window is identical to the corresponding parameter box for this instrument in the Environment.

```
▽ Honky Tonk
(Instrument)
Icon      ⊠⊞
Cha   ÷        1
Prg⊠  ÷        3
Vol⊠        184
Pan⊠         86
Transpose
Velocity   +  6
Lim  C-2    68
VLim    8  127
No Seq Trp    □
Delay
Auto Style
```

Opening and Closing the Instrument Parameter Box

Click the small triangle (top left) to open or close the instrument parameter box.

Name

The top line shows the instrument name, which can be edited by clicking on it.

Track Object Type

The track object type is given in brackets and cannot be altered. Normally this will be: *(Instrument)* or, if you're using multi-instruments:*(Sub Channel).*

Selecting an Icon

Grabbing the icon opens a flip menu where you can choose an icon to represent the instrument. If you hold down the⌥ key while you do this, the flip menu will remain open when you let go of the mouse button, and you can step through it using the cusor keys.

If you have shut the instrument parameter box or it is hidden from view, you can select an icon directly from the track column by clicking on the one you want while holding down the ⌥⌘ keys.

Removing an Instrument from the Instrument Menu

Icon ⊠🖳 The small box to the left of the icon determines whether the instrument appears in the instrument selection flip menu of the track list. You will generally always have this checked on for instrument objects.

To make things clearer you can remove other Environment objects such as faders or MIDI ports from the selection menu by not placing a check next to them.

Setting a MIDI Channel

The MIDI channel is set on the far right of the *Cha* parameter. This defines the channel on which the instrument outputs data, so that your 'real' instrument can receive this data.

Cha ÷   4 If the instrument has been connected up by hand in the Environment window using cables, you need make no further settings here. Just to the right of *Cha*, a small division sign ("÷") will appear .

Instead of this, however, you can set *M0* to *M31* or *P0* to *P31*. This means that the instrument is then directly connected to one of your MIDI interface's MIDI Outs. This is a sort of hidden connection, as there is no visible connection for the instrument in the Environment window.

M... oder *P...* indicates whether your MIDI interface is connected to the modem or printer port. *...1* to *...31* indicates the MIDI port number if you have a multi-port interface. A setting of *0* transmits the data to all ports and should therefore be used only if you have a small interface with just one port. Remember that it is possible to have an interface with several MIDI Out sockets, but only one actual MIDI port (see also page 1 - 3).

The purpose of a hidden direct connection is to enable you to address the individual MIDI ports directly from the Arrange window without having to switch to the Environment.

Logic

Adjusting the Sound of a Track

The *Prg*, *Vol* and *Pan* parameters transmit program changes, volume controllers (#7) and pan controllers (#10) respectively.

Prg ⊠ ÷   3
Vol ⊠   104
Pan ⊠   88

If there is no check in the respective box the default value is used. Only if you place a check in the box (by clicking it) will the corresponding value be transmitted. If there is already a check in the box, any value alterations you make are transmitted immediately.

The program change may be selected on the right via a flip menu; volume and panning are set using the mouse as a slider. If the autolink function to SoundSurfer or SoundDiver is active, or when dealing with multi-instrument sub-channels, sounds can be selected from a flip menu by name. If you hold down the ⌃ctrl⌃ key, any value can be increased or decreased by clicking on them above or below the middle.

On the left of the sound (program) number, there is an extra parameter: Bank Select. If your sound source can receive Bank Select messages (MIDI controller #0 or #32 — check in your synth handbook), you can switch between different banks, each containing a maximum of 128 sounds.

As many devices cannot receive these messages, you can deactivate this parameter by making this adjustment.

Prg ⊠ ÷   3

For more on all the other parameters, take a look at the descriptions in the section *Instrument* on page 7 - 16.

Recording Program Changes, Volume or Pan controllers

Of course, any of the types of events that can be transmitted by checking the right square in the instrument parameter box can also be stored when in record mode. For example, in record-pause mode, you can store program changes at specific positions in the following way:

- Remove the cross in the square next to Prg (or Vol, or Pan);
- Click on Pause, then Record;
- Move the Song Position line to the place you want;
- Choose the sound (program) you want (or the volume/pan setting you want);
- Click on the box next to Prg (or Vol,or Pan). The right kind of event will be sent and recorded.

Click on Stop to come out of Record mode.

6.4   Sequences

Sequences are containers for the MIDI events within them. Their purpose is to make things clearer and easier to deal with. They also correspond to the musical convention of treating a phrase or a riff as a single unit. It is often better to apply many operations (e.g. quantization) to these units rather than to individual notes.

Sequences within a track can be partly or wholly overlapped, but for clarity's sake this should be avoided.

Remember that all the following operations with a plural in the heading (sequences) apply just to selected sequences.

Creating a Sequence

Normally a sequence is created automatically when you record on the selected track. It begins at the start of the bar in which the first events were recorded and stops at the end of the bar in which the last event was recorded.

Sequences can also be created by directly inserting events from the clipboard into the Arrange window (see the section *Inserting events* on page 6 - 18).

Creating an Empty Sequence

Click with the pencil at the position in the Arrange area where you want the empty sequence to begin. You can now enter the events manually in one of the Editors.

Deleting Sequences

You can delete all the selected sequences by clicking them with the eraser or by pressing the ⌫ key. You can also delete any non-selected sequence by clicking it with the eraser.

Deleting muted sequences

The function **Edit > Select Muted Objects**, as the name suggests, selects all muted sequences, folders, and – in LOGIC Audio – Regions.

A quick tap on the ⌫ key is then all you need to delete these objects in a flash.

Retrieving Deleted Sequences

Of course if you accidentally delete a sequence you can restore it by choosing **Edit > Undo** (⌘Z) immediately afterwards.

Even after several editing operations it is still not too late to retrieve a sequence, because all deleted sequences actually end up in the trash. The function **Structure > Trash > Open Trash** opens the otherwise invisible trash folder. You can then transfer the desired sequences onto the clipboard (Copy or Cut) and add them back to the song (Paste). An even neater method is simply to drag the sequences from the trash window into the Arrange window!

The function **Empty Trash** irreversably deletes the contents of the trash. If there are a lot of objects in it the song will take up less space when it is saved if you choose this option.

The option *Empty Trash whenever Saving a Song* on the Global page of the Preferences (when checked) deletes the contents of the trash *after* a song is saved. This means the next time you load the song you still have access to the deleted sequences from the previous session!

Moving Sequences

Sequences may be moved by grabbing them and dragging them with the mouse pointer. You can move sequences both timewise and from one track to another. You can also move them between two Arrange windows, even if they belong to different songs.

... Between different Songs

If you move a sequence from one song into the Arrange window of another, the sequence is automatically copied over, rather like the MacOS copies files over automatically if they are located on different drives.

... Limiting direction

You can limit the movement or copying of objects in the Arrange window to one particular direction — just as in the Score and Matrix editors. To do this, just activate the option **File > Preferences > Global > *Limit dragging to one direction in Arrange*.**

While you're moving objects, you can toggle the direction limiting on and off by pressing the ⌥ key quickly.

Joining sequences together

By selecting **Functions > Modify Object Borders > Tie Objects by Position Change**, you can remove the empty spaces between selected sequences by moving them all together. When you do this, the first sequence remains unchanged. This is particularly handy for seamlessly joining audio regions together in LOGIC Audio.

Moving sequences to the current song position

The keyboard command *Pickup Clock Position* allows you to move the selected sequence (or the first of several selected sequences) to the current song position.

Editing the beginning of a sequence numerically

You can edit the start of a sequence (and its length) numerically. This can be done from an event list on the arrange level (see the section *List Structure on the Arrange Level* on page 9 - 9) or in a floating event window (see the section *Event Float Window* on page 9 - 15).

Copying Sequences

To copy sequences to another point in the song or to other tracks, hold down the ⌥ keys while moving the sequence.

Copying Sequences in Multiples

The function **Repeat Objects...** in the **Edit** menu allows you to repeat one or more selected sequences. The repetition always starts at the end of the sequence itself or at the end of the latest (timewise) sequence.

Number of Copies

This is where you enter the number of copies (excluding the original).

Roundation

This is where you determine whether you want a copy to begin exactly at the end of the original (or the previous copy) (setting: *None*) or whe-

Logic

ther you want the start-point to be "quantized". In most cases the *Auto* setting will do what you want.

As

This parameter determines whether the repeats are *copies* or *aliases* of the original (see also page 6 - 39).

Please also note that there is a sequence parameter called »Loop«, which repeats a sequence over and over up to the next object on the same track (see the section *Loop* on page 6 - 21).   Note

There's an even more flexible copy function — for more on this, check out the section *Copying Events Selectively* on page 6 - 54.

Altering the Length of Sequences...

6

Grab the sequence at the bottom right corner with the pointer or pencil. You can now move the end of the sequence wherever you want. Even when you shorten sequences the data in them is never deleted; playback just stops at the end of the sequence.

The Clip Length sequence parameter determines whether the notes sounding when the sequence ends should be abruptly cut off (on), or whether they should be played to their normal end point (off), irrespective of where the sequence ends.

You can also move the start of the sequence by grabbing it at the bottom left corner. However, you can never move the start beyond the first event in the sequence, i.e. you can never alter the length of the sequence from the front. If you want to remove the start of the sequence you have to cut it and mute or delete the start.

... of multiple selection ...

You can change the length of multiple objects in the same way. The length will be changed by the same absolute value.

... to the same absolute length

If you want to bring all selected sequences to the same absolute length – even if they had different original length – simply hold 🔳🔲 while changing the length (like in Matrix Editor or the Event List).

...rounded to whole bars

The function **Modify Object Borders > Snap Objects** in the **Functions** menu rounds the start to the nearest whole bar.   ✐

When you lengthen or shorten sequences this never alters the position of the events contained within it! Unless you want it to do so by using the following function:

...by time-compressing or -expanding the contents

Hold down ⌨ while you are altering the length. The timing of the events in the sequence will be stretched or compressed in proportion to the amount by which you've altered the length.

Using this method you can make a rhythm sequence play "half-time" by stretching it to twice the length, or "double-time" by shortening the length to half the number of bars.

...to adjust it to fit the events

The function **Functions > Modify Object Borders > Set Optimal Object Sizes** reduces or increases the length of an object so that all the events in it (or other objects) are tightly enclosed. The object borders are rounded to the nearest bar.

If you hold down the ⌨ key when you call up this function the borders are rounded to the nearest beat instead.

...to adjust it to fit other sequences

When you choose **Functions > Modify Object Borders > Remove Overlaps** all selected sequences in a track are searched for overlaps. If an overlap is found the sequence that begins first is shortened by enough to remove the overlap.

With **Functions > Modify Object Borders > Tie Objects** all selected sequences are lengthened so that they join up with the following sequence on the same track.

...using a Finer Grid

All these operations (moving/copying, lengthening/shortening) are done in accordance with the bar or beat grid (depending on the current resolution of the bar ruler and the extent of the zoom function). However, there are two ways of refining the grid:

Format values as grid scale: ctrl + operation.

No grid (ticks as grid scale): ctrl ⇧ + operation.

All you need to do is hit these keys during a particular operation.

You want to shorten a sequence in a 4/4 bar so that the "4" is played but not the "4 and" of the last bar. Enlarge the screen display until you can see quarter beats in the bar ruler. Now grab the bottom right corner of the object and move the mouse to the left until the sequence is shortened by one quarter beat. Then press (and hold) `ctrl` and move the mouse carefully to the right until the sequence has become one division longer. While you are doing this the right side of the Arrange window's title bar shows the track number followed by the current length of the object in bars, beats, divisions and ticks. The three righthand numbers should be "3 1 0".

Cutting Sequences...

Choose the scissors. Now click the desired sequences and keep the mouse button held down. The left side of the title bar of the Arrange window shows the current position of the mouse. When you release the mouse button, all selected objects are cut at the relevant position. The grid is based on the Display Format value. This value is displayed and editable on the Transport window, just below the Time Signature indicator.

If any notes overlap other notes by more than a 1/16 note, the following dialog will appear on-screen:

> "Overlapping Notes found!
> Do you want to keep,
> to shorten or to split those?
> [KEEP | SHORTEN | SPLIT]"

KEEP (default) leaves all notes unaltered. The sequence is cut as usual, but when you do this, you can end up with notes in the left-hand half that are much longer than the sequence now is. Such notes are played normally, unless "Clip Length" is set to cut off all sounding notes at the end of a sequence.
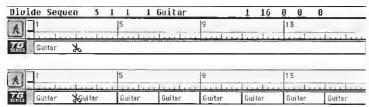
SHORTEN cuts down all overlapping notes, so that the note ends fall on the cutting point.

SPLIT divides overlapping notes across the two sequences created when a cut is made; two neighbouring notes are created, with the same pitch and velocity, and the same total length as the original note.

...multiple cutting with the scissors

If you hold down the ⌥ key whilst cutting an object with the scissor tool, the selected sequence will be cut into several pieces, whose lengths are determined by the length of the first piece.

For example: To divide a 16-bar sequence into 8 2-bar sequences, cut the sequence at the start of bar 3 whilst holding down the ⌥ key.

Cut at the Song Position

With **Structure > Split/Demix > Split Objects by Song Position** you can split all selected objects exactly at the SPL. All objects will be devided at the nearest bar with the key command *Split Objects by rounded Song Position*.

...at the Locator Positions

The function **Structure > Split/Demix > Split Objects by Locators** cuts all selected sequences which are located wholly or partly between the locators at the left and right locator positions. All the objects created between the locator positions as a result of the cutting operation are then selected.

...graphically

You can achieve the same effect when setting up a cycling region with the mouse in the bar ruler by holding down the ⌘ key. The difference between this method and the above is that if no objects are selected, they are *all* cut into pieces.

Joining or Merging Sequences

You can merge two or more selected sequences in a track into a single sequence by clicking on one of them with the glue tool.

The function of the glue tool is the same as **Structure > Merge > Objects**. This merges all selected sequences, even those on different tracks, into a single sequence in which all the events from the individual objects retain their original time position. However, the individual

MIDI channels are replaced by the MIDI channel of the instrument that is playing at the time. The new object adopts the name and track of the first (timewise) of the merged objects.

Take a look at the section *Merge/Normalize and MIDI Channels* on page 6 - 24 for more on this.

The function **Structure > Merge > Objects per Tracks** has the same effect as Merge Objects, but if the selected objects are on several different tracks they are combined into one object **per track**.

Demixing Sequences

The function **Structure > Split/Demix > Demix by Event Channel** searches the selected sequence for events with different MIDI channels. A separate sequence containing all the relevant events is created for every MIDI channel found. Each of these sequences is created on a track with an instrument that has the same MIDI channel. If no such tracks exist the tracks are created on a track with the original instrument.

The function **Demix by Note Pitch** searches the selected sequence for notes with different note numbers. A different sequence of the same length is created for every note number found. The tracks created for these sequences have the same instrument as the original sequence.

Muting sequences

Often when you are arranging, you will want to test musical ideas out by muting certain objects. This is what the mute tool is for.

You can mute individual or selected objects by clicking them. They are then displayed with a dot before the object name. Clicking a muted object reverses this state (unmuting).

You can perform the same function using *Mute Folders/Sequences*.

Muting Tracks

As soon as you move the mouse pointer over the left side of track number it changes into a mute tool. Clicking a track stops playback of the whole track and a dot appears in front of the track number. Clicking again unmutes the track.

Soloing sequences

You can solo any selected sequences using the *Solo* button in the Transport window or the keyboard command of the same name. Double-clicking on the Solo button or using the keyboard command *Solo Lock* 'locks' the solo'd status, so you can change selection, return to a locked sequence later, and it will still be solo'd. A further click (or using the keyboard command again) quits solo mode. For more on this, read the section *Solo and Solo Lock* on page 5 - 11.

• The solo tool enables you to solo individual or selected objects by clicking them and holding down the mouse button. You can also scrub the object by horizontally moving the mouse. If LOGIC is in play mode solo playback starts as soon as you stop scrubbing. Release the mouse button to end solo listening.

Naming a Sequence

One sequence: click the sequence with the text marker tool and a text input box appears. Enter the name and press ⏎ or click another object or the background.

Several sequences: select the sequences (e.g. by rubber-banding) and click on one of them. All the sequences are then given the same name, unless the name ends with a number. In this case all sequences receive the same name but with consecutive numbers. The numbering is done according to the time position of the sequences. If you want all the sequences to end with the same number just add a space!

The same applies if you are entering the name in the sequence parameter box.

Special Functions

Inserting events

MIDI events can be added directly to the selected track on the the Arrange window, at the current song position, from one of the edit windows (or even from another song) via the clipboard.

This function allows you to insert MIDI events — e. g. from the Matrix Editor — directly into the Arrange window. LOGIC checks as it does this that you have selected a sequence, and then adds the data to that sequence. If you have *not* selected any sequences, LOGIC will create a new sequence on the selected track.

Deleting events

...outside the sequence borders

Functions > Erase Midi Events > Outside Object Borders allows you to erase all MIDI events beyond the start and end points of an object.

...double Events

The function **Functions > Erase MIDI Events > Duplicates** searches all selected sequences and all sequences in selected folders for identical events with the same time position. Any events occurring twice or more at the same position are deleted (so that only one remains).

- The search looks for notes, controllers, monophonic aftertouch and program change data.
- Events of the same type but with different channels are not treated as identical.
- The "same time position" includes two notes which are output simultaneously because of the current quantization setting.

There are more functions for deleting events on the Arrange level — and they're described in the section *Copying Events Selectively* on page 6 - 54.

For more on the other functions used for editing events on the Arrange level, take a look at the section *Arranging Techniques* on page 6 - 52 .

6.5   Sequence Playback Parameters

The sequence parameter box is situated to the left of the track list above the tool box.

Displaying Sequence Parameters

Simply select a sequence — and straight away, you should be able to see its parameters. If the sequence parameter box isn't visible, select **View > Hide/Show Parameters**).

None of these parameters alter the original data of the sequence, they only affect the playback.

Default Sequence parameters

If no sequence is selected, the upper line of the sequence parameter box will read *»Midi Thru«*. When you record a new sequence, the set-

tings in the >Midi Thru< parameter box are carried over into the new sequence's parameter box. The MIDI Thru parameter box can therefore be viewed as an adjustable default parameter box.

Live processing

As you know, there is always one track selected to whose instrument any MIDI data played in live is relayed. Data of this kind can also be processed through the MIDI Thru parameter box. You can bring the values up (and edit them) by deselecting all sequences (click on the window background, for example).

Setting up the MIDI Thru parameters to match those of a sequence

Using the keyboard command *Set Midi Thru Parameters by Object*, you can set the MIDI Thru parameters to match those of a selected object (whether a sequence or folder). This action also selects the track belonging to that object.

Editing Several Sequences Simultaneously

If several sequences are selected, the number of selected sequences appears instead of the name. If you now alter any sequence parameter this alteration affects all the selected sequences. If a parameter was set differently in the individual sequences, a >*< appears. You can still alter this parameter for all the selected sequences and the value differences will be retained (relative alteration). If you want to set the same value for all the selected sequences hold down ⌨ while you input the value (absolute alteration).

Opening and Closing the Box

To the left of the name is a small triangle. Clicking it shows or hides the contents of the box, just like the folders in the Macintosh Finder (when the contents are viewed *By Name*). If the box is closed there is more room for the elements below it.

The Sequence Parameters

Though these are called sequence parameters, they may also be made to affect folders, in which case they apply to all the sequences within them. The following passages therefore often refer to objects, which in this case means arrange objects, i.e. sequences or folders.

If a sequence parameter is set to its normal value, the display of the parameter value is hidden to make the display clearer.

Logic

Name

The top line in the sequence parameter box simply shows the name of the selected sequence: in the example shown here, it's "Sequence".

```
▽ Sequence
Qua  16D Swing
Loop         ON
Transpose  +  7
Velocity   -  9
Dynamics   88%
Gate Time 125%
Delay         8
```
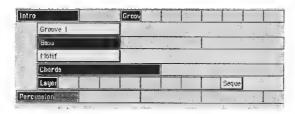
Qua

Covered in section *Quantization* on page 6 - 26.

Loop

Value range: On or Off. Normal value: Off.

When switched *On* the looping object is repeated on its track until it comes up against another object. A loop also finishes at the end marker of a higher folder or the song end marker. These repeats are displayed as grey beams (with no object name). The length of the individual loop elements is exactly determined by the length of the original object, so if you want to create polyrhythmic structures, try experimenting with the length of the original object.

One way of ending a loop early is to create an empty sequence with the pencil. A better method is to place the object with the loop in a folder. You can then create loops of any duration simply by altering the length of the folder.

The *Toggle Loop* key command may be used to switch the loop parameters of selected objects on and off.

Functions > Sequence/Instrument Parameters > Turn Loops to Real Copies transform the loops into real copies of the original object and simultaneously switches the *Loop* parameter in the resulting objects to *off*.

Functions > Sequence/Instrument Parameter > Loops to Aliases changes sequence loops to aliases. This function is also available as a keyboard command.

Transpose

Value range: +/- 96 semitones. Normal value: 0.

All note events contained in the sequence are transposed up or down by the set amount during playback. Even complete folders can be instantly transposed in this way. If some individual sequences within the folder have already been transposed the relative differences between them are retained.

If you want to transpose by octaves grab to the left of the parameter field between the word "Transpose" and the actual value. This opens the flip menu shown here to allow direct input of octave transpositions.

To guard against drum notes, etc. being transposed the instrument parameter box contains a parameter called *No Instrument Transpose*. If you place a check in this box the transpose parameter is ignored in all sequences played by this instrument.

Velocity
Value range: +/- 99. Normal value: 0.

All notes in the relevant object are altered by the set velocity value. Positive values are added and negative ones subtracted, although naturally it is impossible to go outside the limits prescribed by the MIDI Standard (1 - 127).

Dynamics
Value range: see diagram. Normal value: 100%.

This parameter also affects the velocity values of the notes, but instead of adding or subtracting a fixed amount the differences between "soft" and "loud" notes (the dynamics) are increased or decreased. This works in a similar way to a compressor or expander. Values above 100% expand the dynamics and so increase the difference between "loud" and "soft", while values below 100% compress the dynamics and so reduce the differences in velocity.

The *FIX* setting means that all notes are transmitted with a velocity of 64. When used in conjunction with the velocity parameter (see above) it is therefore possible to set any fixed velocity value.

Gate Time
Value range: see diagram. Normal value: 100%.

The term "gate time" stems from the technology used in analog synthesizers and refers to the time between pressing and releasing a key. This parameter therefore affects the absolute note duration or length. This should not be confused with the musical note value, which normally refers to the amount of time until the next note. The technical

term "gate-on time" or "note length" is described musically as extreme staccato and legato. The parameter range is referenced to this scale. »*Fix*« means extreme staccato; likewise the other values below 100% shorten the note lengths. Values above 100% lengthen the notes. The »*leg.*« setting produces a completely joined up playing style for all the notes with no regard to their original lengths. Here, too, there is a relative effect on the sequences in the lower levels of a folder.

Delay
Value range: -999 to 9999 ticks. Normal value: 0.

This parameter alters the time position of the selected objects. Positive values correspond to a delay (laid-back playing style or dragging), negative values cause a pre-delay (driving or rushing).

The units are ticks. A tick is the smallest time resolution in a sequencer, which in the case of LOGIC is 1/3840th note. On the right side of the delay value field you can use the mouse as slider to input the value.

If you click to the left, between the word "Delay" and the delay value the flip menu shown here appears for you to set the delay in terms of note value.

```
1/1
1/2
1/3
1/4
1/6
1/8
1/12
1/16
1/24
1/32
1/48
1/64
1/96
0
-1/96
-1/64
-1/48
-1/32
-1/24
-1/16
-1/12
-1/8
-1/6
-1/4
```

6

You can use the **View** menu to switch the display to milliseconds, using **Delay in ms**. This can also be used to calculate delay times for different note values at various tempos:

- Set the desired note value by clicking to the left of the delay value.

- Go to the **View** menu and switch to **Delay in ms**.

- Set the desired tempo in the transport panel.

- The delay parameter will now show the delay time.

The delay parameter is mainly used for musical purposes. It is also a way of evening out some of the various delays that may occur for a variety of reasons. These delays are always caused by one of the following:

- The attack phase of the sound lasts too long. A good musician will automatically compensate for this by playing the notes slightly early. With very slow sounds you may need a pre-delay of over 100 ms to even them out.

- The sound generator is reacting too slowly to the incoming note-on message. Older multitimbral sound generators often take tens of milliseconds before beginning to output a voice. This effect may be better compensated for by using the delay parameter in the in-

strument parameter box since it is independent of the attack pha-
se (sound) and voice allocation!

- The delay in outputting the voice is not even constant because it
depends where it comes in the order of notes arriving quasi simul-
taneously at the sound generator. You should therefore try pre-
delaying rhythmically important tracks by as little as one tick - it
can work wonders!

Fixing And Neutralising Sequence Parameters

You can normalize the sequence parameter settings of all selected
objects using the command **Functions > Sequence/Instrument
Parameters > Normalize Sequence Parameters** (*Normalize*). This
means that all settings are actually written to the data and the play-
back parameters resume their normal values. The audible result
remains the same. The loop and extended sequence parameters are
not affected. Using this function is effectively like saying "make these
sequence/instrument parameter values permanent".

Merge/Normalize and MIDI Channels

Just like the Merge function or the Glue tool, the Normalize function is
intelligent with respect to stored MIDI channel numbers. If all stored
events have the same MIDI channel number, it will be changed into the
number of the instrument currently playing back. If the events are on
different channels, LOGIC will ask if you would like to convert the chan-
nels or not.

In addition, the following variants on Normalize are now available by
selecting **Functions > Sequence / Instrument Parameter > ... :**

... **Normalize w/o channel** leaves the stored channel number
untouched;

... **Normalize w/o channel & delay** leaves the stored channel num-
ber *and* delay parameters untouched.

If the instrument playing back is set to the channel setting *All* , or
you're dealing with a completely different type of Environment object
(e.g. a Channel Splitter, for use with *M-Playback*), then the stored MIDI
channel numbers will remain sensibly unaffected by the 'usual' Norma-
lize function.

A quick tip: if you're editing sequences that are appearing as notation
on a polyphonic score style, we recommend using *Normalize without
channel.*

Extended Sequence Parameter Box

In addition to those parameters in the sequence parameter box, the extended sequence parameter box contains some extra settings. These include the more comprehensive quantization parameters which are covered from page 6 - 26 onwards.

Opening the extended sequence parameter box

To open the float window containing the extended sequence parameters you either use the command **Options > Extended Sequence Parameters** or double-click on the left half of the of the sequence parameter box (next to the parameter names).

```
 MIDI THRU
Qua  16D Swing
Loop         ON
Transpose  +  8
Velocity   +  7
Dynamics    94%
Gate Time  112%
Delay      -   2
Q-Swing     56%
Q-Strength  88%
Q-Range      9
Q-Flam      13
Q-Veloc    -13%
Q-Length   -  7%
Clip Length  ON
Score      off
```

Clip Length

Value range: On / Off. Neutral value: Off.

When switched *On*, this parameter causes any notes stretching beyond the end of a sequence to be cut at the end of the sequence. However, clip length is purely a playback parameter, i.e. the data of these longer notes is not affected nor is their display in the editor windows.

The point of this function is to allow you to alter the length of a note directly on the arrange level, by adjusting the length of the sequence. Clip length has no effect on folders.

Score

Value range: On / Off. Neutral value: On.

When switched *Off*, this parameter removes the relevant object from the Score Edit window. This is useful if the sequence does not contain any notes but just other data (e.g. controller data).

Special Functions for Sequences

Adding Prg, Vol and Pan as Events

The command **Functions > Sequence/Instrument Parameter > Insert Instrument MIDI Settings as Events** allows you to add the program, volume and panorama (*Prg, Vol, Pan*) settings as actual MIDI events in the instrument parameter box of one or more selected sequences. The events are placed a quarter note before the beginning of the relevant sequences. Only the activated (checked) settings in the instrument parameter box are added as events. If there are already any events of the same kind, these are overwritten.

Adding Variable Program Changes

The function **Functions > Sequence/Instrument Parameter > Insert Variable Program Changes** in the same menu adds a "variable program change command" to one or more selected sequences. This is placed a quarter note before the beginning of the sequence (s) concerned.

<div align="center">

0   4   1   1 Program 1 ⊠ of Instrument

</div>

During playback this event replaces the missing program number in the Prg-Ch message with the setting in the instrument parameter box. By clicking the checked box in the in Event List you can turn this into a normal program change event. You can also alter this event's position or its program number data byte in the Event List .

6.6   Quantization

Quantization is the rhythmic correction of notes on a specific time grid. Any inaccurately played notes are moved to the nearest position on this grid.

For example, if the smallest notes in a passage are 1/16th notes, you should use 1/16th quantization to move all recorded notes to their ideal rhythmic value. This will only work if no note has been played more than 1/32nd from the ideal position, otherwise the nearest 1/16th will be the one next to the proper note.

How It Works

Quantization settings are made in either the sequence parameter box or the extended sequence parameter box. They are playback parameters, so they can be replaced by another setting at any time. This also means that by setting the *Qua* parameter to *off (3840)* you can always revert to the unquantized original recording. Unlike other playback parameters, you can monitor the audible *and* visual effect of the quantization in the editor windows, thus allowing you to see from the position of the notes what effect the quantization parameters are having. The quantization affects only notes, not other types of events (e.g. controllers).

For every note event, two positions are stored internally: the *original position* that was played in, and the *playback postion* (also shown in the Editor windows). For unquantized sequences, both positions are the same. Each time you quantize, a new playback position is calculated from the *original position*.

The *Fix Quantize* command (see the section *Fixing the Quantization* on page 6 - 29) overwrites the *original position* with the *playback position*. The same thing happens if you change a note in one of the Editors manually — although then you can't return to the original value!

What it works on

Quantization only works on notes, not on other types of events like controllers. Apart from notes, all events have just one position parameter, which you can leave or change permanently by using Event Quantise or dragging with the mouse.

Essentially, quantization works on the whole sequence. To quantize single notes only, use the event quantization in one of the Editor windows (to quantise events other than notes, read the section *Event Quantization* on page 8 - 11).

If you wanted to quantize various parts of a sequence differently, you could divide the sequence up, and use different quantizations on each part of the sequence. You can then recombine the parts of the original sequences without this affecting the way the parts are played. The quantization grid always begins at the start of a sequence. If the sequence does not start at the beginning of the bar, neither does the quantization grid.

Qua

The quantization grid is set from a flip menu under the *Qua* parameter in the sequence parameter box.

Alternatively, you can step through the available quantisation resoluti-

ons from the flip menu, one at a time, using the keyboard commands *Quantize: next value* and *Quantize: previous value*. This function sets the quantize for all sequences.

Quantization off

The setting *off(3840)* plays the notes with the finest possible time resolution: 1/3840 note, which is practically unquantized playback.

Normal quantization

The settings *1/1, 1/2, 1/4, 1/8, 1/16, 1/32* and *1/64 note* quantize the sequence to the equivalent note value.

1/192-Note
8 & 12
16 & 12
16 & 24
9-Tuplet
7-Tuplet
5-Tuplet/8
5-Tuplet/4
8F Swing
8E Swing
8D Swing
8C Swing
8B Swing
8A Swing
16F Swing
16E Swing
16D Swing
16C Swing
16B Swing
16A Swing
off (3840)
1/1-Note
1/2-Note
1/3-Note
1/4-Note
1/6-Note
1/8-Note
1/12-Note
1/16-Note
1/24-Note
1/32-Note
1/48-Note
1/64-Note
1/96-Note
off (3840)

Triplet quantization

The settings *1/3, 1/6, 1/12, 1/24, 1/48* and *1/96 note* quantize the sequence to triplet note values. A *1/6 note* is equivalent to a quarter triplet, *1/12 note* to an eighth triplet, *1/24 note* to a sixteenth triplet and *1/48 note* to a thirty-second triplet, etc....

Mixed quantization

The setting *8 & 12* corresponds to eighths and eighth triplets, *16 & 12* to sixteenths and eighth triplets and *16 & 24* to sixteenths and six-teenth triplets. Mixed quantization always applies both note values and thus naturally requires greater precision when playing.

Odd quantization

The setting *9-Tuplet* means novetuplets (1 bar = 9 beats), *7-Tuplet* is septuplets (1 bar = 7 beats), *5-Tuplet/4* is quarterquintuplets (1 bar = 5 beats), and *5-Tuplet/8* is eighthquintuplets (1 bar = 10 beats). If you seriously want to use eighth septuplets in your composition please write to us (or ask your physician or psychiatrist for professional help).

Further quantization parameters

The following quantization parameters are located in the extended sequence parameter box, which can either be opened by double-clicking on the left half of the sequence parameter box, or via **Options > Extended Sequence Parameters...** .

Q-Swing

Value range: 1% - 99%. Normal value: 50%.

This percentage value alters the position of every second point in the current quantization grid. Values over *50%* delay the beats and values under *50%* pre-delay them. The best practical settings are between *50%* and *75%* which give strict quantization a swing feeling.

Q-Strength

Value range: 0% - 100%. Normal value: 100%.

This percentage value determines how far a note is shifted towards the nearest grid position. *100%* produces a full quantization, *0%* leaves the note in its recorded position.

Q-Range

Value range: 0-3840 ticks. Normal value: 0 ticks.

All notes whose distance from the nearest grid position is greater than the number of ticks set here are not quantized. The value *0* means that every note is quantized.

If you enter negative values for *Q-Range*, you are using **Far only Quantize**. In this mode,only the notes *outside* the set region (in ticks) are moved to the ideal quantization grid positions; while notes closer in remain unquantized. This way, the worse-played notes outside this region are moved to perfect timing positions on the quantization grid, or at least moved *towards* these positions depending on what *Q-Strength* value is set (see below).

Q-Flam
Value range: +/- 3840 ticks. Normal value: 0 ticks.

Notes with the same time position (e.g. chords) are spread out by this parameter. Positive values produce an upwards arpeggio, negative values a downwards arpeggio. The first note of the arpeggio is unaltered.

Q-Veloc
Value range: -99% to +127%. Normal value: 0%.

This percentage value determines how much the velocity values of the quantized notes are affected by the velocity values in the template sequence (see the section *Groove* on page 6 - 30). At *0%* the notes retain their original velocity, and at *100%* they adopt the velocity values of the template. Negative values alter the velocity so that the deviation from the template becomes even greater.

Q-Length
Value range: -99% to +127%. Normal value: 0%.

This percentage value determines how strongly the note lengths of the quantized notes are affected by the equivalent note lengths of the template sequence (see the section *Groove* on page 6 - 30). *0%* has no effect, while at *100%*, the notes adopt the exact note lengths of the template. Negative values alter the note lengths so that the deviation from the template is increased.

Fixing the Quantization
In the same way that the other sequence parameters can be normalized, the quantization settings can also be adopted permanently by the stored data.

The command is **Functions > Sequence/Instrument Parameters > Fix Quantize.**

Of course once this is done it is impossible to revert to the original recording.

Pre-quantization

The **Fix Quantize** function is especially suited to pre-quantization. For example, if a recorded sequence cannot be immediately quantized to a 1/16 swing without producing a few incorrect notes, start by quantizing it to 1/16th notes and then call up Fix Quantize. You can now apply any swing quantization to this cleaned-up version of the sequence.

If you are recording a hi-hat pattern consisting of 1/16 notes and one single 1/32 note, first play the rhythm (quantized to 1/16 notes) without the 1/32 note and choose Fix Quantize. You can now raise the quantization to 1/32 notes and add the extra note without misquantizing any badly-played 1/16 notes. The whole process lasts 2 cycles without interrupting the recording.

6.7   Groove

In the early days of sequencers, many people thought that electronic music sounded mechanical or sterile. This impression (which, at the time, was a pretty fair observation) was based on the fact that sequencers could only output notes that were quantized. This is no longer the case. LOGIC's resolution is so high that at a tempo of 120 it can differetiate between two notes that are just 520 microseconds apart. This is equivalent to a single oscillation cycle of the highest note that you can play on a soprano saxophone!

So, if you think modern sequencers always sound mechanical, you're guilty of unfounded prejudice (a capital offense in some states).

Of course, using the quantization functions described from page 6 - 26 onwards, it is still *possible* to generate sterile timing if that is what you actually want (although even straight quantization can be given a groove with the aid of the *Q-Swing* parameter).

LOGIC also allows you to use your own quantization grid (or Groove Template), making full use of the system's high time resolution.

Your Own Quantization Grid (Groove Template)

Your own quantization grid is known as a "groove template". Instead of quantizing the notes to one of the preset grids, you can define the small timing deviations which give a sequence that special groove as the template for other sequences to copy.

Creating Your Own Quantization Template (Groove)

The function **Options > Groove Templates > Make Groove Template** transforms the exact timing of the notes in the selected sequence into a quantization template. It then appears in the flip menu of the *Qua* parameter (in the sequence parameter box) under the name of the sequence on which it is based. It can be used on any other sequence in exactly the same way as the rest of the items in the Quantize flip menu.

In general, two-bar model sequences are particularly well suited to this function, but you can use sequences of any length. Make sure that the model sequence actually contains a note on every desired quantization value!

Deleting a Quantization Template

Use **Options > Groove Templates > Remove Groove Template from List** to delete the selected model sequence from the list of possible quantization templates. The next time you open the flip menu this quantization template will no longer be available.
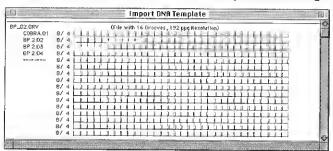
Importing Quantization Templates

You can also import 3rd-party quantization templates, such as those made by the Canadian firm WC Music Research (DNA Groove Templates). First, you must copy the templates into a folder called "Grooves" which must be on the same level as the LOGIC program itself. If necessary, create a folder there with that name yourself.

You can then use the function **Options > Groove Templates > Import DNR Groove Templates...** to import the templates. All the DNA Groove Templates in the Grooves folder are displayed graphically along with their names. Just click a groove template to apply it immediately to the selected sequences. If you like the groove, you can transfer it into the list of the quantization templates by double-clicking on it.
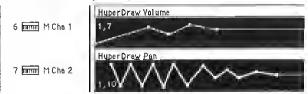
LOGIC then creates a folder (if one is not already present) for these imported groove templates called "Grooves!" (this is an arrange object "folder"). The groove templates are then stored as sequences.

By converting the DNA grooves into stored sequences, the quantization templates can now be used even when the song is played on another computer whose hard disk does not have a Grooves folder with the relevant DNA Groove Templates.

6.8   Hyper Draw

Hyper Draw is the easiest way to create and edit volume and pan changes (or any kind of controller data) in the Arrange window. The changes in controller data are made by graphically editing dots (or curve points), which represent fixed controller values. The dots are then joined up automatically by LOGIC, which creates events to give a smooth flow of controller data from one fixed value (ie. one curve point) to another. The automatically generated events are recalculated every time you edit the curve points.)

You can activate Hyper Draw for each individual sequence. For example, you could open Hyper Draw windows to control volume in one sequence, and pan in another.

In sections where the controller being edited does not change in value, the controller curve appears as a thin, horizontal line.

Hinweis   Remember to choose a suitable vertical zoom resolution, so that you can actually *see* the HyperDraw curves!

Activating Hyper Draw

To activate Hyper Draw for the currently-selected sequences, select the type of event you want to display and edit, and select **Options** > **Hyper Draw....** You can select different Hyper Draw modes for different sequences.

You can choose the following types of events directly from the Hyper Draw menu:

- Volume
- Panning
- Balance
- Modulation
- Breath
- Foot Control
- Portamento Time
- Expression
- Channel Pressure
- Pitch Bend
- Program Change

By calling up **Options > Hyper Draw > Channel ...** you can choose the MIDI channel on which events will be displayed and edited. If you select *any* here, events will be shown irrespective of their MIDI channel. When inserting events, the most recently selected MIDI channel will be used.

Display

When sequences are displayed in Hyper Draw mode, both the MIDI channel and the Controller being edited are displayed on the left, divided by a comma.

Midi channel # 1,
Controller # 7 (Volume)

If the channel is set to *any* (default) the first number (MIDI channel) will not be displayed. Then the controller events of all channels will be displayed. Inserted events get the channel of the track's instrument.

Autodefine

This Option sets the Hyper Draw parameters automatically so that the first event of the sequence will be displayed.

Hyper Draw Float window

If you want use Hyper Draw to edit a controller which is not directly available in the Hyper Draw menu, call up **Options > Hyper Draw > Other ...** and then enter the number of the controller and the Midi channel in the window which appears. As soon as you select a new

sequence you will see the corresponding Hyper Draw parameters in this window.

This floating window always displays the Hyper Draw parameters for the selected sequence (s).

Deactivating Hyper Draw

To switch off Hyper Draw for selected sequences choose
Options>Hyper Draw>Disable.

Key Commands for Hyper Draw

The following key commands are available in the Arrange window to speed up the use of Hyper Draw:

- Hyper Draw: Disable
- Hyper Draw: Modulation
- Hyper Draw: Volume
- Hyper Draw: Pan
- Hyper Draw: Other...

Hyper Draw – Functions

Making Hyper Draw visible

If you can't see the blue Hyper Draw window, up the scale of the Arrange window, either with a keyboard command, the telescope icons, or by holding down the ⌘ key and using the magnifying glass tool.

Adding new curve points

Just click on the blue background of a sequence with Hyper Draw active — you can use either the pointer or the pencil, and a curve point will appear. As long as you hold down the mouse, you can move any of the curve points. The position and value are displayed in the Info line on the upper edge of the Arrange window.

Hinweis   The curve will not fill in, and the new events will not be generated, until you let go of the mouse button.

Deleting curve points

Click briefly on any curve point to delete it.

Moving an existing curve point

Just grab a curve point with the mouse and move it. If you hold down the mouse button while you do this, you can undelete erased curve points by rubbing the mouse over where they used to be.

Fine-tuning curve points

While you move a curve point, hold down the ⌃ key. You will then only be able to move the point vertically, but be able to select all 127 possible steps.

Moving a curve point with all subsequent curve points

Hold down the ⌃ key while moving a curve point. All curve points will then move together. You can then adjust the 'amplitude' of what is, to all intents and purposes, a controller 'waveform', by simply touching its upper or lower edge with the mouse.

Using Colors with Hyper Draw

You can globally assign colors to different controller numbers and Midi channels which are then used as presets to display the Hyper Draw lines. However the background color for Hyper Draw (blue) is fixed.

Select a Hyper Draw sequence, open the color selection window by choosing **View>Object Colors**... and choose a color. This will globally assign the color to this controller and channel. Now whenever you select this controller on this channel in any song, the color allocation will be used.

If you want to define the color for the sequence you must first deactivate the Hyper Draw function.   Note

Making practical use of Hyper Draw

Hyper Draw is very simple to use. For example, choose **Options > Hyper Draw > Volume**. A blue area appears beneath the sequence name and by clicking here with the mouse you can set or delete the dots. You can also move the dots by holding down the mouse button. While you are editing an Info line appears at the top of the Arrange window indicating the bar position and controller value.

If you want to edit pan values choose **Options > Hyper Draw > Pan**. This means that only pan events will be generated and displayed. This rule applies to all types of events, i.e. only one type can be displayed at any one time, although as many controller events of that one type may appear.

If you've selected *Cha: All* in the current instrument parameter box, so that all MIDI channels 1-16 will play back, you will have to choose the MIDI channel you want to edit via **Options > Hyper Draw > Channel**....

Tips   **A few tips**

You can still move and copy sequences when Hyper Draw is active, by grabbing them by their top edges in the title list.

Even when Hyper Draw is active, you can change the start and length of a sequence. But it can be difficult to move curve points if they're very close to the beginning or end of a sequence. The best thing to do is erase such a point by clicking briefly on it, and then create a new one in the right place. If possible, let the sequence extend before and after any region where you wish to make use of controllers.

Tip   For LOGIC Audio: if you want to edit the left and right channels of an audio track in real time, use the new stereo object. This allows you to alter the volumes of both stereo channels together.

Tips   **If Hyper Draw starts behaving oddly...**

Hyper Draw supports Program Change events. These are not interpolated like Controller events to give smooth curves; instead, one program number remains set until the next curve point!

Note   Controller events will only be displayed if their MIDI channel matches the one set for Hyper Draw (set by calling up **Options > Hyper Draw > Channel...**).

Note   If you make alterations to a group of events (e.g. volumes) in another editor (e.g. the Event or Hyper Editor) you will not see any alterations in the Hyper Draw display until you have selected or deselected the relevant sequence.

6.9   All About Folders

A folder is an arrange object that can contain other arrange objects, just like a folder in the Finder can contain other folders or files.

The best way to imagine a folder is as a song within a song. A folder also has as many tracks as you want with sequences on them. The inside of a folder looks just the same as the arrange area and track list in a song.

On a track of the song a folder looks like a sequence, only with a dotted surface.

```
Folder
```

This could contain tracks like trumpet, saxophone and trombone which you arrange into a brass section, or 14 tracks of drum instruments which you want to treat as a single drum pattern object.

Equally, your entire song, with all its tracks and sequences, could itself be an object appearing as a grey beam in another song. In this way, you could arrange several songs to make up a concert.

This is not all folders can do. You could use folders to represent the parts of a song(e.g. choruses and verses). And just as in ordinary desktop usage, you can place as many folders as you like within other folders within yet more folders (say for the instrument groups *within* the different parts of the song, for example), with no limit on the number of levels you can create if you wish.

Another possible usage might be to store different arrangements of a song in different folders, so you could switch between them rapidly... That's enough for you to be thinking about for the moment. We'll leave the rest up to your imagination...

The "Folder" as a Track Instrument

A folder is normally placed on a track set to *Folder* in the track list instead of to an instrument.

This means that all the objects in the folder are played by the instruments set in the *folder's* track list.

If you place a folder on a track that is set to a normal instrument, its entire contents are played by this instrument. This usually only makes sense if the folder contains tracks for just this instrument. However, this could offer a quick way of listening to a string arrangement, for example, if not all the intended sound sources are available.

Creating Folders

The function **Structure > Pack Folder** places all the selected objects in a folder. The folder is created on an existing folder track. If no track with a folder instrument is available, LOGIC creates one.

In a similar way, if no object is selected, LOGIC creates a track with a folder on it. This contains no objects — just tracks with all the instruments from the current level.

Changing Display Levels

Going into a Folder

To change to a lower level of the Arrange window, double-click the relevant folder.

Go Into Folder or *Sequence* does the same, but make sure the folder is selected before choosing this option. If a sequence is selected an Event List is opened showing its contents.

Quitting a Folder

To change to a higher display level of the Arrange window, double-click on the background or click the close symbol (rectangular black dot) in the top left, next to the menu heading.

Go Out of Folder or *Sequence* does the same.

Adding More Objects

…is as easy as drag-and-drop. Drag the objects from the original track onto the folder at the desired position and release the mouse. If the folder does not already contain a track with the same instrument as the original track, LOGIC creates one. When you look inside the folder, you will see the object you dropped in at the position you dropped it at.

Unpacking Individual Objects

If you want to move individual objects from a folder to a higher level there are two ways of doing so:

*   Go to the display level where you want to add the object. Now open a second Arrange window by pressing ⌘⑦ . Go into the folder from which you want to remove the object and drag it from one Arrange window into the other.

*   Go to the display level from which you want to remove the object. Select the object and transfer it onto the clipboard by pressing ⌘Ⓧ . Change to the display level where you want to add the ob-

ject. Select the desired track, and set the song position line at the point you want, and then add the object by pressing ⌘Ⓥ.

Unpacking Folders

Use the command **Structure** > **Unpack Folder** to dismantle the selected folder. The objects contained within it are placed on tracks set to the appropriate instruments. If these tracks are not available they are created.
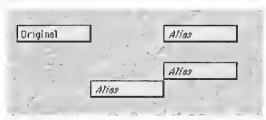
Other Operations using Folders

In principle, you can do anything with folders that you can do with sequences. Please reread all the operations described from page 6 - 10 onwards if you need to remind yourself what these are. Anything described here for sequences also applies to folders.

6.10   Aliases

An alias in LOGIC is the same as an alias in the Finder. It looks like an object, but contains no actual data. It is just a reference to the data of the original object — a virtual "double" of the original. You can always recognize an alias, because its name is written in *italics*.

If the data of the original object is altered, this immediately affects all the aliases created from it.

This is the whole point of aliases. For example, if an accompanying line (a sequence or folder) keeps recurring throughout a song, it makes sense to use aliases, rather than have full copies of the original eat up your storage space. Furthermore, when using aliases, if you feel something is not quite right, you only have to alter the original and the correction will automatically take effect throughout the whole song. If you

just want to alter a detail at one point in the song, you can turn that particular alias into an editable object.

Creating an Alias

To create an alias, just hold down 🖰 when you are copying the object as usual (so hold down ⌥🖰+drag).

There is also the command **Alias > Make** in the **Structure** menu. The alias appears on the selected track beginning at the current song position.

If several objects are selected, their relative time and track positions are retained. The selected track is the destination track for the first (timewise) object.

When you use the function **Repeat Objects** in the **Edit** menu this also contains the option *as Alias* (see page 6 - 12).

You can use **Structure > Alias > Make but Copy Folder** to create aliases of the the current selection, just as with the Mac Finder command "Make Alias". If a folder is selected, a "real" copy of the folder is created, and aliases of all the objects in the original folder are placed inside. The advantage is that within this "real" folder, you can (for example) set up mutes, and alter program, instrument or playback parameters if you wish to.

Playback Parameters

Although an alias is a double of the original, it has its own playback parameters. The exception is the original's quantization parameters, which, because of their special status, always apply to aliases too.

Reassigning an Alias

The function **Structure > Alias > Reassign** assigns a new original object to an existing alias. Both the alias and the intended new original object must be selected first.

Logîc

Search Functions For An Original Or Alias

Finding the original of an alias

If you have forgotten where the original is for a certain alias, select the
alias and choose the function **Structure > Alias > Find Original** which
will select the original object for you. Another method is described in
section *Contents Visible in the Object* on page 6 - 56.

Finding the alias of an original

Conversely, you can select the original of a particular object, and find
any aliases you've made from it; just select **Structure > Alias > Select
All Aliases of Object**. All exisiting aliases will then be selected for you.

"Orphan" aliases

If you erase an object from which one or more aliases have been crea-
ted, LOGIC will warn you with the following message:

One or more Aliases ore mode from objects to be cleored!
Do you still wont to cleor these?

»**Don´t Clear**« cancels the erase procedure, while »*Cleor*« deletes the
object after all. If you do this, it makes no sense to keep the aliases after
you've deleted the original, but because LOGIC does not do this for
you, you could well end up with so-called "orphan" aliases — that is, ali-
ases without an original. Although such objects can serve no useful pur-
pose, LOGIC doesn't automatically delete them, as you might decide to
assign them new originals later.

Selecting all orphan aliases

Structure > Alias > Select All Orphan Aliases selects all aliases
whose original sequences no longer exist.

Deleting orphan aliases

Structure > Alias > Delete All Orphan Aliases deletes all the aliases
that no longer have originals. You can use this function to tidy up after
deleting lots of objects, as this will possibly leave a load of old, unneces-
sary aliases hanging around.

Turning the Alias into a Real Object

You can use **Structure > Alias > Turn to Real Copy** to make a real
object from an alias; its contents will be identical to those of the origi-
nal object of the alias.

Editing an Alias

This is not possible. If you double-click on an alias, LOGIC assumes that
you either want to edit the original or turn the alias into a real object.
The following dialog box appears:

> ⚠ This is an Alias without data
> Do you want
> to make and edit a real copy or
> to edit the original?
>
> [Cancel] [Real Copy] [**Original**]

Click on the desired field; 🔲 opens the editor window containing the
original object.

What happens to the aliases if two or more objects are
mixed together?

If you edit an original object by mixing it with others, any existing alia-
ses are automatically updated to reflect the changes.

6.11 Markers

Markers are bits of text (of any length) which can be assigned to speci-
fic song positions. The first text line of a marker is its name, which
appears in the bar ruler (unless there is not enough room). The whole
text belonging to a marker can be viewed in the marker text window.

You can see the order of the markers in the Marker List window, which,
as its name suggests, is a specialized event list window for markers.
Markers have a specific duration or length, irrespective of the extent of
the actual text . A length of 1 tick means that the marker stretches to
the next marker, or to the end of the song or folder.

Markers can be used as namable stores for locator positions.

Creating Markers...

...graphically...

You can create a marker at the start of any bar you like, simply by positioning the mouse in the lower third of the bar ruler, holding down the ⌘ key, and clicking . A Marker Text window will open.

If a marker is already present at this point (or up to a quarter note further away), a new marker will not be created. The same goes for any other methods of creating markers (via menus or keyboard command).

...using an existing marker

Whether you've just created a marker or whether you're using one that was already present, you'll need to give it a name. Double-click on the marker whilst holding down the ⇧⌘ctrl keys A text input field will open for you to name the marker.

...by menu or keyboard command

To create a marker at the current song position (rounded to the nearest bar), select **Options > Marker > Create** or use the keyboard command *Create Marker.* This does not open a Marker Text window, thereby making it easier to create several markers at once, one after the other.

...without rounding to the nearest bar

Options > Marker > Create without rounding (or the keyboard command *Create Marker w/o rounding*) does much the same, although the position of the marker is not rounded to the nearest bar.

... using objects

Selecting **Options > Marker > Create by objects** creates markers for all the currently selected objects. These markers take on the names of the objects they are created from.

... within a cycle

To match existing markers to the length of a cycle, drag the cycle bar into the lower third of the bar ruler. For more on this, see the section *Creating a marker to fit a cycle* on page 6 - 45.

Deleting markers

Grab a marker in the bar ruler and drag it down, out of the bar ruler. Let go when the mouse turns into a hand pointing downwards.

To delete a marker at the current song position, you can also choose **Options > Marker > Delete**.

Changing marker texts/names

You can change marker text in the Marker Text Window (see also page 6 - 45). The marker name of a marker appears in the bar ruler, and is always made up of the first *printable* characters of the marker text. So although your marker text might start with several returns, the name in the bar ruler and marker list will still be made up of the first line of printable text — not a load of invisible returns.

To open the Marker Text window, hold down the ⬆⌘ keys while clicking on the marker.

Direct naming

By holding down the ⌃⌘ keys and double-clicking on a marker in the bar ruler , you can enter the marker name directly. The Marker Text window will still open if the selected marker already has some lines of text in it.
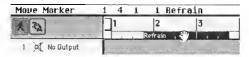
No name

Tip If you want the marker to go without a name, just type ⌦ and ⏎ instead of the first line, or ⌦⌫ and ⏎.

Changing the marker position/length

Changing the marker position is simple; you just grab the marker in the bar ruler whilst holding down the ⌘ key and move it, in quarter-note steps. As usual, you can change the size of the steps by holding down additional keys: ⌃ to move in division steps (whatever is currently set), and ⬆⌃ to move in ticks (depending on horizontal zoom resolution).

The marker length can be edited numerically in the Marker List window (see also page 6 - 47). Alternatively, you can create a cycle to fit the length you want, and then drag the cycle onto the marker (see *Adjusting a marker to fit a cycle* below).

Markers and Locator Positions

Creating a marker to fit a cycle

Set up a cycle in the region where you want to create a marker. Drag
the cycle out of the top third of the bar ruler into the bottom third of
the bar ruler. As soon as the mouse pointer assumes the shape of the
index finger shown here, release the mouse button.

Adjusting a marker to fit a cycle

Exactly the same as Creating a marker to fit a cycle. If you drag a cycle
onto an existing marker, the marker adopts the length of the cycle.

Adjusting a cycle to fit a marker

Drag the marker out of the bottom third of the bar ruler into the top
third of the bar ruler. As soon as the mouse pointer assumes the shape
of the index finger, release the mouse button. A cycle will now have
been set with the same position and length as the marker.

If LOGIC is not running when you do this, the current song position will
be set to the start of the marker.

You can adjust the cycle length to fit a marker in other ways, if the mar-
ker is selected: you can use the keyboard command *Goto pre-
vious/next Marker*, or click on the arrow button in the Marker Text win-
dow, or click on a marker with the pointer tool in the Marker List
window. The current song position will also be set to the start of the
marker if you carry out any of these operations.

Markers and the Song Position

Setting the song position to the start of a marker

If you click on a marker in the bar ruler while holding down the ⌘ key,
the current song position will be set to the start of this marker. You can
do the same by dragging a cycle onto the marker (see *Adjusting a cycle
to fit a marker* above).

Marker Text Windows

Opening the Marker Text window

To open the Marker Text window, double-click on a marker in the bar
ruler while holding down the ⇧⌘ keys. Alternatively, open a Marker
List window by selecting **Options > Markers > Open Text** and ... **Open
Text as Float**.

This is where the text of a marker can be input, edited and displayed in the usual way. The local **Edit** menu contains the well-known commands: Cut, Copy, Paste, Clear and Select All.

The text is always automatically formatted according to the current size of the window.

Switches

The open book indicates that you are in the Marker Text window. Clicking it takes you to the Marker List window. Clicking the walking man ensures that you always see the text of the current marker displayed here.

The two arrows enable you to leap to the previous (up arrow) or next marker (down arrow), without having to leave the window. These are equivalent to the keyboard commands *Goto previous Marker* and *Goto next Marker.*

Turning off text input in the Marker Text window

By turning this switch off, you can protect existing text from accidental alteration. You can still use all keyboard commands, though, even those that require the use of just one key (with or without shift).

Note

Before you can enter *any* text, the A switch must be turned on (white background)!

Automatic Selection

An » * « as the first symbol in the text means that the whole marker text is selected when you open it. This allows you to directly overwrite the default text (» * Marker«).

Selecting a Word

You can select a whole word by double-clicking on it.

Altering the Appearance of the Text

You can use the **Font**, **Size** and **Face** local menus to select these attributes for all selected characters. All the fonts in your System folder are available.

Color...

The command **Face > Object Colors...** (*Open Object Colors*) opens the LOGIC color palette with 80 colours. Double-clicking a color opens the Macintosh color selection to allow you to alter the preset color.

...for characters

All selected characters are colored appropriately when you click a color in the LOGIC color palette.

...for the background

If you hold down the ⌘ key and click on a color in the LOGIC color palette, the background of the marker text window is colored accordingly.

...for the bar ruler

The selected background color for marker text is also shown in the bar ruler. If dark colors have been selected, the text automatically appears there in white instead of black.

Marker List Window

The Marker List window shows all the existing markers as an event list. Here you can copy and delete markers, and edit their position and length. You can also adjust the locator positions to fit a marker or select a marker for text editing.

Opening the Marker List window

The commands **Options > Markers > Open List** and **... Open List as Float** open Marker List windows. To avoid having too many unwanted windows open, these commands also close any Marker List windows already open.
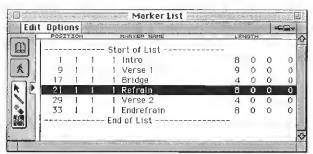
Selecting this command once more closes the Marker List window again.

Buttons

The book allows you to open the selected marker, i.e. switch to the Marker Text window.

Clicking on the walking man (who then turns blue) ensures that the current marker is always selected.

Tools

The pointer

has the usual selection and editing functions. Selection: by clicking, clicking with the ⌘ key held down, and 'rubber-banding' in the vicinity of the marker name. Editing: use the mouse as slider, direct value input by double-clicking. Double-clicking on the name opens the text editor.

The pencil

duplicates a marker by selecting it. You can then edit the position and length of the duplicated marker in the relevant columns.

The eraser

deletes the marker by clicking on it.

The index finger

sets the song position at the start of the marker and sets the locator positions according to the marker. Can be used in addition to carry out normal editing functions. The index finger is the default tool in the Marker List window when you open it.

'Playing' markers

If you click on a marker in the Marker List window with the index finger, the marker's contents will be displayed for as long as you hold down the mouse button.

Locking markers to SMPTE position

By selecting **Options > SMPTE Position > Lock**, selected markers can be locked to their SMPTE positions. As with events or sequences in the event list, a lock icon appears in front of the marker name. These mark-

ers then retain their absolute time positions, to the extent that if you change the song tempo, the markers will move their bar positions.

```
╔═══════════════════ Marker List ═══════════════════╗
║ Edit Options                                  ⊏▭▭▼ ║
║         POSITION      MARKER NAME        LENGTH    ║
║ ┌─┐  ------------ Start of List ------------       ║
║ │▥│  1: 0: 0: 0. 0   ▣Establishing   0: 0: 4: 0. 0 ║
║ │木│  1: 0: 4: 0. 0    Detail         0: 0: 3: 0. 0 ║
║ │▸│  1: 0: 7: 0. 0   ▣Chase          0: 0: 3: 0. 0 ║
║ │╱│  1: 0:10: 0. 0    Zoom through   0: 0: 6:12.40 ║
║ │✎│  1: 0:16:12.40    Inside         0: 0: 1:12.40 ║
║ │▤│  1: 0:18: 0. 0    Final          0: 0: 2: 0. 0 ║
║      ----------- End of List ------------          ║
╚═══════════════════════════════════════════════════╝
```

The locks can be removed by selecting **Options > SMPTE Position > Unlock**.

6

Local menus

Edit

Contains the usual clipboard and selection commands. The *Select all following, Select inside Locators,* and *Toggle selection* commands can be operated from the keyboard.

Options

Position & Length in SMPTE units toggles between a display of the marker positions and lengths in bars or in SMPTE time.

Length as Absolute Position toggles between a display of the marker lengths (duration) or the marker end points.

Summary of marker mouse commands

Without modifier keys:

- grabbing a marker and pulling it upwards sets a cycle to the length of the marker,

- grabbing a cycle and pulling it down to the marker area on the bar ruler matches the marker length to the cycle length,

- grabbing the marker, dragging it downwards and letting go of it deletes the marker (Undo possible).

All the other actions in the marker area have no effect on the marker, but on the song position line (SPL) instead, e.g. positioning (clicking), scrubbing (dragging), and Start/Stop (double-clicking).

With the ⌘ key held down:

- a short click creates a marker at that position. Initially, the marker has a length of one tick, in other words "until the next marker",

- a short click on an existing marker positions the SPL at the start of the marker,

- double-clicking on an existing marker starts the sequencer from the beginning of the marker,

- grabbing and pulling left/right moves the markers (additionally holding down ctrl or ⇧ctrl selects finer grid divisions for movement),

- grabbing and pulling upwards / downwards sets cycle lengths/erases markers (as with no modifier keys).

Clickingwhile holding down the ⇧⌘ keys

-double-clicking opens the Marker Text window.

Double-clicking while holding down the ⌘ctrl keys

- opens a small text input field for names (if the marker holds more than a few lines of text the Marker Text window will open instead).

Clicking while holding down the ⌥⌘ keys

- creates a marker at that position, even if this region belongs to a marker postioned earlier. One exception: if the postion selected is nearer than a quarter note to the start of an existing marker. In this case, no new marker is created in order to avoid having two markers in the same position.

Clickingwhile holding down the⇧ctrl⌘ keys

- creates a marker, even if one was already there. The small name input field opens automatically after this.

Marker Meta Events

Whenever Meta event #51 ("Goto Marker Number") is played, LOGIC jumps to the position of the marker whose number (in your song) matches the value (data byte) of the Meta event. You can generate this Meta event in one of two ways:

1. With an Environment fader object whose Out definition is set to »Meta«, or

2.   as a pre-defined, automatic Goto marker, which you insert into the event list (by clicking on the "001 011" button while holding down the ⌘ key).

Meta event Goto instructions are ignored when external synchronization is in use.

For more on Meta events, read the section *Meta Events* on page 9 - 14. The section *Special Faders* on page 7 - 50 also tells you how faders can generate Meta events.

6

6.12   Arranging Techniques

If necessary you should rereadthe section *The Mouse* on page 4 - 2, the section *Selection Techniques* on page 4 - 18 and the section *Edit Operations* on page 4 - 21 in Chapter 4 *Using LOGIC*. These sections and the techniques covered in the section *Sequences* on page 6 - 10 will teach you how to perform most arrange operations.

This section only describes functions which

- only have an effect on a particular part of the song, which you determine with the **Locator positions,** or
- cause a reaction between objects and **Locator positions**.
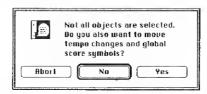
Adjusting locators to fit selected objects

Selecting **Functions > Set Locators by Objects** sets the locators so that they are flush with one or more selected objects.

Set Rounded Locators by Object(s) rounds the locator positions to whole bars.

Adding or Removing Passages

The function **Structure > Cut/Insert Time >...** allows you to remove a passage from a complete arrangement and insert a gap, or add the cut passage to another part of the arrangement. All bar changes, tempo changes and global score symbols are shifted accordingly.

Alternatively, you can change just a few selected objects. In this case, you have to tell LOGIC whether any bar changes, tempo changes and global score symbols should be shifted as well. The following dialog box appears::

Not all objects are selected.
Do you also want to move
tempo changes and global
score symbols?

Abort   No   Yes

Press ⏎ if you don't want to move the tempo changes and global score symbols too.

The global editing is then done automatically if **all objects** are selected. Otherwise, the functions are restricted to those tracks whose objects (at least those between the locator points) are selected.

Inserting a gap across all tracks

Structure > Cut/Insert Time > Insert Time and Move by Locators

The selected objects are cut at the left locator. All objects to the right of the left locator are moved to the right by a cycle length. This creates a gap between the the locators. Objects which began at the left locator now begin at the right locator.

Removing a passage

Structure > Cut/Insert Time > Snip: Cut Time and Move by Locators.

The selected objects are cut at the left and right locators. The objects created between the locators are deleted (i.e. copied to the clipboard and erased from the song, as with *Cut*) and all objects to the right of the right locator are moved to the left by the length of the cycle stretch. All objects which began at the right locator now begin at the left locator, and the passage between the locators is removed from the arrangement.

Inserting a passage

Structure > Cut/Insert Time > Splice: Insert snipped Part at Song Position. This function combines the existing functions "Insert Time and Move by Locators" and "Paste": All selected objects at the song position are cut and a passage of a cycle length is inserted. The cut objects are then pasted back from the clipboard to the (unchanged) song position.

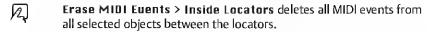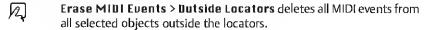### Practical usages

"Snip" - removing an entire section of a song — e.g. a chorus .

"Splice" - inserting the part in another place in the song. To ensure all tracks are shifted, including tempo, time signature changes, and markers, please slect everything beforehand (with ⌘Ⓐ).

Deleting Selected Events

There are several ways of deleting events from selected objects directly in the Arrange window. One method is to choose the **Erase MIDI Events >...** command from the **Functions** menu.

Erase MIDI Events > Inside Locators deletes all MIDI events from all selected objects between the locators.

Erase MIDI Events > Outside Locators deletes all MIDI events from all selected objects outside the locators.

Copying Events Selectively

Functions > Copy MIDI Events... is used to copy (or move) MIDI events within selected sequences. You define the region that you want to move or copy with the left and right locators. The current song position marks the destination position where you want the data to be added.

The left & right locators

These surround the region containing the source data (also called the source region).

Destination

This allows you to define the destination position independently of the song position.

Number of Copies

Defines the number of copies.

Create New Sequence

When set to *on* allows you to create a sequence at the destination position containing the copied (moved) events.

Mode

Defines the copy mode:

Copy...	copies the selected section (the selected section remains in its original position).
Move...	moves the selected section (the source data are removed from their original position).
...Merge:	The source data is mixed with the data already present at the destination position.
...Replace:	The data already present at the destination position is deleted and replaced by the source data.
...Insert:	All data already present at the destination position is moved to the right by the length of the source region.
Move Rotate:	The source region is moved to the destination position. The data that was previously there and the data between the source region and the destination position are all moved towards the source. Thus the data is not altered or deleted but rotated.
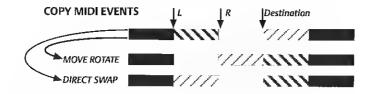
Select a sequence. Set the song position to exactly the start, the right locator to exactly the end and the left locator, e.g. 1/4 note before the end. Choose **Functions > Copy MIDI Events...** and set the *Mode* to *Move Rotate*. Now, every time you press ⏎, all events are moved a 1/4 note backwards, and the events in the last quarter are moved to the front.

Direct Swap:	The source region is exchanged with a region of the same length starting at the target position.

6.13 Altering the Display

For information on the basic window functions, please refer to the section *Window Functions* on page 4 - 8.

If you want to know how to maximize the room available for the Arrange area please refer to the section *Relationships Between Windows* on page 4 - 14. The Arrange window also contains the following functions:
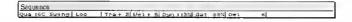
Hiding/Showing Track Numbers

The menu item **Uiew > Show Track Numbers/Leuel Meters** allows you to conceal/reveal the track numbering with its integrated level indicators.

Object Display
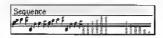
Sequence Parameters Visible in the Object

Enlarge the display using the vertical zoom button. In one zoom setting you will be able to see the sequence parameters displayed in the bottom half of all the objects. Here you can directly edit the sequence parameters with the mouse (by means of sliders and/or flip menus).

Contents Visible in the Object

If you vertically zoom the display further, you will be able to see the actual contents of the objects.

Sequences show notes or controller events, folders show the objects they contain and aliases show the name and position of their original.

The option **Uiew > Object Content** allows you to see a display of the contents, even at tight zoom settings – although you do this at the expense of the object name. Selecting this function again, whether via menu or keyboard, returns the display to normal.

Object Colors

For instructions on how to define normal object colors, please refer to the section *Defining Colors* on page 4 - 28. The instrument colors may be set in the Environment.

Newly recorded sequences initially adopt the color of the track instrument. However, after copying sequences between tracks, you could find the Arrange area starts to resemble a patchwork quilt. In this case, the function **View > Instrument Colors To Objects** replaces the colors of all selected objects with the colors of the instruments playing the objects concerned.

The **File > Preferences > Display >** *Colored Background of unselected Sequences* option allows you to have all sequences displayed in gray, with colored names; only selected sequences then adopt the chosen colors.

Altering the Background of the Arrange Area

Use the function **View > Show Grid** to switch on/off a track/bar number grid in the arrange area's background.

Change Background toggles the background from either gray or high-resolution (depending on the way the option **File > Preferences > Display >** *High Resolution Background* is set up) to white.

6.14   Reset Functions

If notes stick

To switch off stuck notes, click on the MIDI monitor in the Transport window, or hit »STOP« twice in rapid succession. In both cases, the reset messages are sent, as set up in **File > Preferences > Reset Messages**. This should at least include an "All Notes Off" command for the port in use. There's more on this in the section *Reset Messages* on page 14 - 33.

The panic button

If the notes continue to sound, then it would seem that your sound sources cannot respond to "All Notes Off" messages:

Double-click on the MIDI Monitor in the Transport window (or use the keyboard command *Send discrete Note Offs*). Separate Note Off messages will now be sent for every note on all channels of every MIDI port. That should do the trick.

Controller reset

Options > Send to MIDI > Reset Controllers transmits a control change message #121 with the value 0 (reset all controllers) on all MIDI channels and outputs used by defined instruments. This neutralizes all sound modulation caused by MIDI controllers like modulation or pitch wheels.

Volume Reset

The function **Options > Send to MIDI > Maximum Volume** transmits a control change message #7 (main volume) with a value of 127 on all MIDI channels and outputs used by defined instruments. This brings all sounds up to their maximum volume, giving your sound sources the optimum signal/noise ratio. If necessary, you can then reduce the volume on your mixing desk.

Transmit Instrument Settings

The function **Options > Send to Midi > Used Instrument Midi Settings** sends all the *Prg, Vol* and *Pan* settings from all the instrument parameter boxes used by all the instruments in the current song. This could help to reset your sound sources for the current song if your synths suddenly change patches mid-performance!

You can set this function up to operate automatically after loading any song by turning on the *Send Used Midi Instrument Settings after loading* option on the **File > Song Settings > Midi Options** page.

6.15 Other Functions

Locating the MIDI Metronome

Options > Locate MIDI Metronome Click... opens an Environment window where the "MIDI Click Instrument" is selected. You can define

Logic

the MIDI click in the instrument parameter box. For full instructions see section *MIDI Metronome Click* on page 7 - 39.

Recording Options..., MIDI Options... Chase Events...

directly opens the respective pages of the Song Settings. For information on the relevant parameters, take a look at the section *Recording Options* on page 14 - 1.

MIDI Interface Communication...

directly opens the appropriate page of the Preferences (for more on this, take a look at the section *Communication* on page 14 - 23).

6

Logic

Chapter 7
The Environment

7.1   Concept

Here are a few pointers to help you understand the basic concept of the Environment and make full use of all its options.

The Situation
- Your setup probably consists of a number of very different MIDI devices. You rightly expect LOGIC to help you manage this heterogeneous setup in an homogeneous manner, if necessary right down to the smallest detail (e.g. a specific sound parameter in a synthesizer).
- The LOGIC program itself consists not only of a normal sequencer but also arpeggiators, MIDI delays, functions allowing you to play entire sequences at the press of a key, etc. Here too, you expect to use only the parts that you really need but in a way that you can understand, i.e. as flexibly as possible.

The Idea
The Environment was developed to satisfy these demands. It refers to LOGIC's environment inside your computer.

Imagine that the Environment window gives you a view of the inside of your computer. Firstly there are the port objects which represent the MIDI inputs and outputs of your computer. In the Environment you create a virtual representation of every device in your real MIDI setup known as an "instrument". You can then address your real devices via these instruments. Some instruments are particularly suited to specific tasks.

In order for this to work properly you have to connect the different objects in the Environment via virtual MIDI cables. This allows you to control the overall signal path within your computer.

The components of LOGIC, such as the sequencer itself or the effect modules (e.g. arpeggiators or MIDI delays) are also available as Environ-

ment objects. In the Environment you can also create virtual faders which generate MIDI events when you move them. The movements of these fader objects can be remote-controlled by other MIDI events and recorded by the sequencer. There are also specialized objects which can split a MIDI signal into different channels, make pre-programmed alterations or even divert the signal path.

Layers

As you can probably imagine, the Environment can quickly fill up with a large number of objects. To keep an overview you can divide the objects into different display levels ("layers"). Think of these layers as being different partial views of the overall Environment. Naturally, you can easily connect objects from different layers.

Don't Panic!

For the experienced user this freedom to alter the signal path opens up fantastic opportunities and lifts LOGIC above the mass of other sequencer programs.

At the same time this great flexibility will initially be confusing to less experienced users. Don't worry. The section *Signal Flow* on page 7 - 10 explains right at the beginning how you can set up LOGIC's basic functions by following a few rules . This also applies to the song settings.

The Concept of the Environment

Flexibility

The Environment allows you to control LOGIC's immediate environment in the computer. Virtual cables give you complete control over the MIDI signal path from the input ports to the output ports. This gives you a high degree of **flexibility** when connecting LOGIC's individual "effect modules".

Adaptability

LOGIC does not address the MIDI ports of your interface directly but via virtual instruments which you can create in the Environment. These virtual instruments act like junctions: events can easily be addressed *to them* from the sequencer and then sent *from them* to a real sound generator. Instruments contain a set of parameters which you can use to define sounds, transpositions and keyboard splits and also compensate for MIDI- or system-related delays in your sound sources. Instruments can therefore also be used as virtual copies of individual sounds in your sound generator. There are also mapped instruments with note assignment tables (drum maps) which you can use to adapt your preferred playing and programming habits to the different key assign-
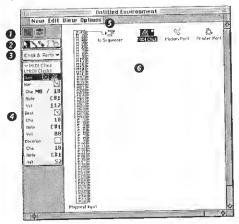
Logic

ments of your sound sources. Or you can create an assignment of faders and knobs for controlling effect devices or automated mixing desks. You can **always adapt** the software to your hardware..

7.2   Operation

Opening the Environment Window

To open an Environment window choose **Windows > Open Environment** (⌘8). Double-clicking on an instrument in the track list of the Arrange window also opens an Environment window showing the relevant instrument selected in its layer.

You can also open several Environment windows simultaneously.

7

❶   Buttons
❷   Tool box
❸   Layer box
❶   Object parameter box
❺   Local menus
❻   The >Click & Ports< layer with objects

Layers

Layers are the "display levels" of the Environment window. They allow you to configure the Environment's display so that you can view and

work with specific groups of related objects (e.g. audio instruments) seperately, rather than having to deal with every single Environment object all the time. You can see the name of the currently displayed layer in the layer box.

The distribution of objects on different layers has no hidden significance — it's just a way of improving general visibility.

> There are some exceptions: objects in the "global objects" layer also appear on other layers; and the "All Objects" layer shows all the environment objects in a list. However, you can ignore both of these layers at first. They are not needed very often, even in very complex Environments.

Switching Layers

| All Objects |
| Global Objects |
| Click & Ports |
| MIDI Instr. |
| MIDI Faders |
| Instruments |
| Instruments |
| Instruments |
| ** Create! ** |

Grabbing the layer box opens the layer flip menu, which you use to switch layers.

Choose **Options > Goto previous Layer** to switch back to the last active layer. (This allows you toggle between two layers.)

Creating Layers

Choosing >***Create!***<from the layer flip menu creates a new, empty layer called >*(unnamed)*< at the end of the list. By choosing **Options > Layer > Insert** you can add a new layer at the current position in the list.

Naming Layers

Double-clicking on the layer box opens the text field for entering the name of the current layer.

Deleting Layers

By choosing **Options > Layer > Delete** you can remove the current layer from the list. Because all the objects contained in it are deleted too, an alert box appears first where you must click >Delete< as a safety measure . >Cancel< or ⏎ breaks off the operation.

Specialized Layers

The position and existence of the first two layers are protected:

All Objects

The top layer in the flip menu always displays all the objects in the Environment; no graphic display is necessary here. The objects in this layer are always shown in the form of a list. If you turn off the **File > Pref–**

erences > Display > *Allow 'All Objects' Layer Option in Environment,*
the »All Objects« layer will be removed from the layer flip menu.

The function Options > Goto Layer of Object allows you to switch to
the layer of the selected object.

Global Objects

In here, the second layer from the top, you can place objects which you
want to be visible in all layers (e.g. the output ports), and these then
appear at the same position in all layers. However, you should place as
few objects as possible on this layer, due to the onscreen clutter that
global objects can create.

Display

Hiding/showing parameter fields

As in other windows by choosing View > Parameters you can hide the
bar with the buttons, toolbox, layer switching and object parameter
box, e.g. if you want to use the Environment window as a display or vir-
tual fader box.

Hiding/showing the cables

By choosing View > Cables (*Hide/Show Cables*) you can do the same
with the cables. This also hides/shows the bar to the right of the indi-
vidual objects, used for moving and sizing the fader objects.

Protecting cabling and object positions

You can prevent the position, size and cable connections of all objects
from being accidentally altered by choosing View > Protect Cabling/
Positions.

Background
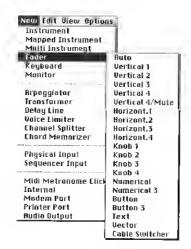
If the cabling and object positions are protected **and** the cables are hid-
den, the background changes from white to gray (or high resolution,
see page 14 - 29). This looks much better for virtual mixing desks and
fader boxes but means that you can no longer see the cables.

List Display

Choosing View > by Text switches the graphic display of the layers to
a list display. The cables are not shown in the list display. This type of
display is most useful in the "All Objects" layer (see section *Specialized
Layers* on page 7 - 5) and for importing Environments from other songs
(see the section *Environment Exchange* on page 7 - 61).

Objects

New	Edit	View	Options		
Instrument					
Mapped Instrument					
Multi Instrument					
Fader				Auto	
Keyboard				Vertical 1	
Monitor				Vertical 2	
				Vertical 3	
Arpeggiator				Vertical 4	
Transformer				Vertical 4/Mute	
Delay Line				Horizont.1	
Voice Limiter				Horizont.2	
Channel Splitter				Horizont.3	
Chord Memorizer				Horizont.4	
				Knob 1	
Physical Input				Knob 2	
Sequencer Input				Knob 3	
				Knob 4	
Midi Metronome Click				Numerical	
Internal				Numerical 3	
Modem Port				Button	
Printer Port				Button 3	
Audio Output				Text	
				Vector	
				Cable Switcher	

Creating Objects

When you choose an object type from the **New** menu, an object of this type is created in the current layer (for more details see the section *Object Types* on page 7 - 14). Clicking with the pencil on the background creates a new (standard) instrument.

You can also copy existing objects: just drag an object while holding down the ⌥ key (see also the section *Moving Objects* on page 7 - 8). Cabling is preserved; so objects copied in this way will be connected in the same way as the original copied object.

Deleting Objects

Click with the eraser, or press the ⌫ key to delete all selected objects.

Adjusting the Size of Objects

You can adjust the size of fader, keyboard and monitor objects by grabbing and dragging the bottom right corner (just like windows). Multiple selections (by 'rubber-banding' or clicking while holding down the ⇧ key) alter in size while preserving their sizes relative to each other.

Choosing **Options > Clean up > Size by Default** (*Reset Size*) sets the size of selected objects to their default value.
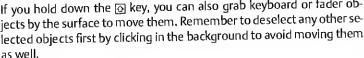
The key commands *Object Width -1 Pixel* or *...+1 Pixel* and *Object Height -1 Pixel*, or *...+1 Pixel* decrease or increase the width or height of all selected objects by 1 pixel.

Logic

Moving Objects

You can move objects by grabbing their icon or name and dragging them to the required position. The surface of keyboard and fader objects is used for their operation. You must therefore either grab the name (if available) or the contact bar to the right of the object.

If you hold down the ⌥ key, you can also grab keyboard or fader objects by the surface to move them. Remember to deselect any other selected objects first by clicking in the background to avoid moving them as well.

Grid
Choose **View > Snap Positions** to align the objects to an invisible grid. It's a good idea to leave snap positions switched on. You only need to switch it off if you want to manually move an object by a few pixels.

You can use the key commands *Object move left/right/up/down* to move all selected objects one pixel in the relevant direction, even when the grid is switched on.

7
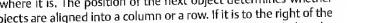
Aligning Objects...

...in a row or column
To align several selected objects horizontally or vertically, choose the function **Options > Clean up > Align Objects**. The top left object stays where it is. The position of the next object determines whether the objects are aligned into a column or a row. If it is to the right of the top left object, all the objects are aligned horizontally. If it is below the top left object, all the objects are aligned vertically.

...to grid positions
If you choose **Options > Clean up > Positions by Grid** all selected objects are aligned to the invisible grid.

Moving Objects Between Layers

... with the layer box
To alter the layer assignment of a group of Environment objects, first select the objects, and then choose the desired layer while holding down the ⌨ key. This shunts the selected objects onto the layer you've chosen.

... with a second Environment window
Another way of moving objects to a different layer is to open a second Environment window. Set the target layer, and move the relevant

objects from one window to the other. You can also use this method to copy objects between layers (using the ⌥ key).

... via the clipboard

A further option is to move objects via the clipboard (**Edit** menu or the usual key commands):

*   Select the objects that you want to move and choose **Edit > Cut** (⌘Ⓧ).
*   Switch to the destination layer.
*   Make sure that no objects are selected (by clicking in the background).
*   Choose **Edit > Paste** (⌘Ⓥ).

Replacing Objects

If any objects are already selected when you go to add objects to the current layer using **Edit > Paste** (⌘Ⓥ) a dialog box appears asking "Replace current selection? No/Replace". If you press ↵ or click Replace, the selected objects will be replaced by the objects in the clipboard. The existing cabling remains intact.

Replacing the Object of the Selected Track

You can replace the instrument of the selected track in the Arrange window with any Environment object. Click the desired object with the MIDI Thru tool.

Please remember: the MIDI Thru function of the sequencer diverts all received events to the Environment object of the selected track. After clicking with the MIDI Thru tool you can then "address" the object directly.

Special Selection Commands

Selecting All Used Instruments

By choosing **Edit > Select Used Instruments** you can select all objects which are addressed by Arrange objects.

Selecting All Unused Instruments

The **Edit > Select Unused Instruments** function allows you to select all the objects that are not being used in the Arrange window, nor addressed by any of the instruments there.

Selecting Cable Destination Objects

By choosing **Edit > Select Cable Destination** you can select the destination object of a selected cable connection. This is particularly useful in two cases:

- The destination object is in a different layer. You can use the function to select and display the destination object in its layer;

- In the list display (**View > by Text**) you can locate the destination object of a source object because selecting the source object also selects its cable connections.
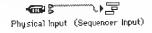
This function allows you to follow the cabling from one serially-cabled object to the next. If several objects are connected, or several cable connections are selected, the function always follows the path of the first cable connection.

Toggling your selection

Just as in the Arrange and Editor windows, you can change the status of any selected objects in the current layer by choosing **Edit > Toggle Selection**.

7.3   Signal Path

Before any MIDI events received at your computer's MIDI inputs can be recorded by the sequencer, you must first make a connection between two Environment objects - the physical input and the sequencer input.

Physical Input (Sequencer Input)

In the sequencer, the events are always directed to the selected track, where they can be recorded. The events played by the track are mixed with all the incoming events arriving at the selected track, and then sent to the instrument set in the track list.

From here, the events are then directed to a MIDI output (see the section *Direct Output Assignment* on page 7 - 11).

However, you can "manually" alter the signal path between the physical input and the sequencer input, and between the instrument and the MIDI Out port to include other Environment objects (section *Cabling* on page 7 - 11).

Direct Output Assignment

You can connect an instrument directly to a physical MIDI output. Set the desired output in the parameter box next to *Cha*.

To select the modem or printer port set *M0* or *P0* before the slash. If your interface has several ports, you can grab the *0* and use the mouse as a slider to set outputs 1 to 31 (you set the MIDI channel after the slash).

Any object with a directly assigned output is marked by a shaded triangle on its right side.

Breaking the direct output assignment

To break the direct output assignment, grab the *M* or *P* and drag the mouse downwards. The division sign is all that is left of the "direct output" parameter, to indicate the interruption. Alternatively, you can disconnect the cable manually.

Cabling

The cabling between Environment objects allows you control over the whole MIDI signal path. A cable is normally shown as a gray line between a source and destination object.

The direction of the signal path between objects is always from left to right, i.e. objects always have their input on the left side and their output on the right side. The output of an object is marked by a small triangle pointing to the right.

If you grab the triangle, the mouse pointer turns into a patch cord representing a cable connection to the output. Now move the mouse to the destination object to connect it with a cable. Once you have selected the destination object (this happens automatically when you touch it) release the mouse button.

If the source object has already been directly assigned to an output, a dialog box will appear telling you this and asking whether you want to replace the direct assignment. You have three options:

- **Cancel**: the connection is not made and the direct output assignment remains intact.

- **No**: your cabling is carried out but the direct output assignment remains intact. The object is therefore invisible, but connected by a visible cable.

EMAGIC

• **Remove** or ⌫: your cabling is carried out and the direct output assignment is removed.

Cabling between Layers

If the destination object of the cabling is in a different layer you can connect it via a selection menu. To do this, hold down ⌥ as you grab the output triangle. A flip menu will appear containing all the defined objects. Choose the desired destination object.

Of course you can also open a second Environment window showing the destination layer, and connect the objects graphically between the windows.

A cable connection to another layer looks like this.

Piano

Multiple Cabling

Multiple Inputs
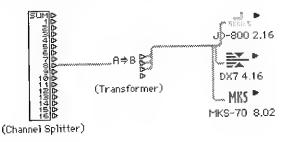
There is no limit to the number of cables that you can "plug" into a target object. All the MIDI signals are then mixed at its input.

Multiple outputs

Once the output of a (source) object is connected to somewhere else via a cable, another triangle appears to allow you to make a connection to a different destination object. You can attach as many cables as you want from an output to various destinations.

Special outputs

There is an exception, of course: some objects have a number of *different* outputs and in this case each output is only available once (e.g. channel splitter, cable switcher or physical input). If you want to route the signal from these outputs to several destinations you must first create a transformer (**New > Transformer**), plug the cable into it, and then connect it to as many other destinations as you want. A newly created transformer does not alter the signal.

(Channel Splitter)

JD-800 2.16

A⇒B (Transformer)

DX7 4.16

MKS

MKS-70 8.02

To plug several existing cables into a common destination, first select the cables. If the cables are already leading to a common destination the simplest way of doing this is by selecting the old destination object. Then grab one of the cables and plug it into the new destination object. A dialog box will appear asking "Do you want to connect all selected cables with new Destination? No/Connect". Click *Connect* or press ⏎.

Cabling Serially

The function **Options** > **Cable** cables a group of selected objects serially beginning with the top left object.

Deleting Cables

To remove a cable connection, click the cable with the eraser. This only removes the cable you have clicked on, not all the selected ones. Alternatively you can grab the source object and release the mouse button while the pointer is on the source object.

You can also use *Clear Cables* to remove all selected cable connections (but note that selecting objects also selects all their cable connections).

Cable color

Cables are given the same color as that of the object they came from (assuming, of course, that your monitor is set up to be used in color). You can switch off the cable coloring and render them all gray with the **View** > **Colored Cables** function.

7.4   Object Types

Overview

(Standard) Instruments

The standard Environment objects. You will usually choose instruments in the track list of the Arrange window, so that the track events will be sent there. The instrument then determines the MIDI channel, output and several other parameters (page 7 - 16).

Mapped Instruments

Particularly useful as drum instruments, as you can protect them against accidental transposition. Any input note may be routed to a different output note, and assigned its own velocity setting, notation, name and output cable (see page 7 - 18).

Touch Tracks

Environment objects which react to note events by playing sequences or folders with multiple trigger and transposition options. These allow you to emulate live performance on an analog sequencer.

Multi-Instruments

A multi-instrument consists of up to 16 individually-addressable "sub-instruments" spread over 16 MIDI channels. They all have one output and up to 15 banks each, with 127 sound names for program change messages (page 7 - 24).

Faders

Faders can be used to create all sorts of MIDI events. Faders come in different forms (e.g. pots or sliders) and be controlled both manually (with the mouse) or by MIDI events (see page 7 - 41).

Buttons

Special faders, which behave like buttons or switches (see page 7 - 46).

Text

Special faders for displaying text (page 7 - 46).

Vectors

Special faders, which can create two different events simultaneously, in two dimensions (see page 7 - 47).

Cable Switchers

Special faders for switching an input (manually or using MIDI events) to a selectable output (see page 7 - 51).

Keyboard

An on-screen keyboard for playing or displaying notes (see page 7 - 29).

Monitor

A monitor in the signal path, which shows the most recent events (see page 7 - 30).

Arpeggiator

This offers multiple options for splitting chords, and functions in a similar way to an old-fashioned analogue arpeggiator (see page 7 - 30).

Transformer

This can transform any part of MIDI events in a programmable way (see page 7 - 32).

Delay Line

A MIDI effects unit for creating all kinds of echo effects (see page 7 - 34).

Voice Limiter

A voice limiter in the signal path limits the number of notes that can be played simultaneously, and can be used to emulate certain monophonic keyboard scan algorithms, or to control the voice allocation of multitimbral sound sources (see page 7 - 35).

Channel Splitter

This splits any incoming signal over different outputs depending on the input MIDI channels (see page 7 - 36).

Chord Memorizer

With this object, each incoming note can produce a programmable chord, with a maximum of 12 voices (see page 7 - 36).

Physical Input

This represents the physical inputs of your computer's MIDI interface, and is normally connected to the sequencer input (see page 7 - 38).

Sequencer Input

Represents LOGIC's input. Signals arriving here are routed to the selected track where they may be recorded and rerouted to the instrument set in the track list (see page 7 - 38).

Logic

MIDI Metronome Click

This instrument generates programmable MIDI notes when the metronome is switched on. If it is played by a percussive sound it sounds like a metronome click (see page 7 - 39).

SampleCell / QuickTime

Instruments with no actual MIDI output. The incoming MIDI signal is re-routed to your computer's internal sound generator, if you have one (see page 7 - 39).

Modem / Printer Port

Represents the physical outputs of the MIDI interface, which are connected to the port of the same name on your computer. If you are using an interface with several ports, you can create one of these objects for each individual port, up to a maximum of 99 (see page 7 - 41).

Object Parameters

The object parameters are set in the object parameter box, which should already be familiar to you from the instrument parameter box in the Arrange window. In fact, the same object in the Arrange and Environment windows is represented by the same box.

Opening/Closing the Object Parameter Box

By clicking the triangle in the top left, you can hide all of the parameters save name and type, and thereby reduce the box to its minimum vertical size.

General Object Parameters

The following parameters are the same for all object types:

Name

The name of the object is shown next to the triangle, and can be selected for editing by clicking on it. Alternatively, you can click the object with the text tool.

Object Type

The object type is shown in brackets and cannot be edited.

Icon/Display Filter for the Instrument List

Grabbing to the right opens a flip menu where you can choose an icon to represent the object in the Environment and in the Arrange window track list.

Placing a check in the box next to it means that the object will appear in the track list instrument selection menu, and can therefore be used as a track instrument. If the box is not checked, the object will not appear in the selection, and a diagonal line will appear through the icon, to help you keep track from the selection menu.

You should only check the icon box if the object can be used as a track instrument.

Instrument

To create a new instrument, choose **New > Instrument** or click in the background with the pencil. Instruments serve as the interface between LOGICs tracks and your actual sound sources.

(Instrument)

The instrument object parameter box will be familiar to you from the Arrange window. Here is a summary of what all the individual parameters mean.

Cha   You set the MIDI channel to the right of the *Cha* parameter. All the MIDI events will then be output on this channel so that a "real instrument" can receive the data when set to that channel. Don't forget that you can directly assign an output (page 7 - 25).

Prg, Vol and Pan:

The *Prg, Vol* and *Pon* parameters transmit program changes, volume controller (#7) and pan controller (#10). If there is no check in the right box, you can edit the value, but it will not be sent until you check the box (by clicking on it). If the box is already checked, any value alterations will be sent immediately.

To the left of the program number, directly to the right of the box, is another parameter: bank select. If your sound sources recognize any Bank Select messages (check in their manuals), you will be able to switch between sound banks. If your sound sources respond to the Bank Select standard message (Controller #32), you will be able to use this parameter directly. If not, please read the section *Defining Your Own Bank Select Commands* on page 7 - 30.

Transpose   The *Tronspose* parameter allows you to define the number of semitones by which all the note events will be transposed as they are output. Negative val-

ues transpose downwards.

Velocity   The *Velocity* parameter allows you to increase or decrease the 'note on' velocities of all sequences played by an adjustable amount.

Lim   The two note values of the *Lim* parameter define a pitch range. All notes outside this range will be ignored by the instrument when it plays a sequence.

VLim   The two values of the *VLim* parameter define a velocity range. All notes whose velocity is outside this range will not be played by the instrument.

Delay   Some sound modules react slightly slower to MIDI commands than others. To ensure perfect timing throughout the whole system, you can drag these instruments "forwards" a few ticks using the *Delay* parameter (all sequences will then be output slightly earlier). You do this by setting the number of ticks to a negative value. Positive values mean that the instrument will be played slightly later. If you want create ate musical or effect delays you should use the sequence parameter of the same name, as this allows longer delay times.

No Seq Trp   If the box next to the *No Sequence Tronspose* parameter is checked, all sequences on any tracks played by this instrument are protected from transposition. In other words the "transpose" sequence parameter is ignored. This is very useful for all instrument with keys assigned to drum or voice samples, as the drum tracks can be protected against transposition, even if the whole folder containing them is transposed.

No Reset   If the box next to the *No Reset* parameter is checked, no more reset messages will be sent to this instrument. This can be useful if controllers are being used for non-musical purposes; for example, if an Instrument represents mixer automation, and not a synth. The reset messages that *can* be sent are defined from via **Preferences > Reset Messages**; but "*No Reset* instruments are of course excluded from these.

Default Score Style

The *Defoult Score Style* parameter in the bottom line of the instrument parameter box determines which score style is preset in any sequence recorded on this

Instrument's tracks. After the recording, the *Auto Style* setting selects a suitable score style, depending on the note range and pitch. Of course editing the score style of a recorded sequence (in the Score Editor) does not affect the Instrument's default Score Style.

Don't forget: the Score Style that can be defined for every sequence determines the note display, e.g. the type of clef or the number of staves. It can be altered in a sequence's display parameter box in the Score window.

The Score Styles of all sequences played by the Instrument can be set to the same style by holding down the ⌃ key when you choose the Score Styles.

Mapped Instruments

To create a new mapped instrument, choose **New** > **Mapped Instrument**.

A mapped instrument is useful for drum programming. It is used just like a standard instrument but has the following special features:

(Mapped Instr.)

• It is preset not to react to the transposition playback parameter,

Each individual input note can also:

• be named (e.g. snare, hi hat...);
• transmit a different output note (e.g. to allow you to play quick patterns on an F#1 hi hat on over several keys);
• be given a velocity offset;
• be assigned its own MIDI channel;
• be sent to one of up to 16 output cables;
• be given its own notation parameters, i.e.

  - note head shape,
  - position above/below the note line,
  - group assignment.

Object Parameter Box

The parameters in the object parameter box are a subset of the object parameters of a standard instrument. You make the specific settings in the mapped instrument window (see page 7 - 20).

Cha   This is where you set the basic channel on which all notes are sent, providing you have not chosen a dif-

ferent channel for any individual notes. In front of the slash you can choose the output port (see also page 7 - 10).

Prg, Vol, Pan   The same function as for instruments. This allows you to send program changes, and volume and pan controllers. If you have placed a check in the relevant box, the value you set will be sent immediately; otherwise, it will not be sent until you check the box. Don't forget that volume and pan controllers are channel messages, and therefore apply to the whole drum set. You can switch sound banks using the division sign in the *Prg* line, providing your sound source responds to the bank select controller (#32).

Delay   The same function as for instruments. All note events are delayed by the set number of ticks (+/- 99). Negative values cause the events to be output before the set time. This allows you to compensate for the time it takes slower sound sources to react to MIDI messages. If you want to create musical or effect-type delays, you should use the sequence parameter of the same name which allows you to set longer delay times.

No Seq Trp   (No Sequence Transpose)
If this box is checked, any transpose playback parameters for this instrument are ignored, which is always useful for mapped instruments. For example, if you have placed a whole chorus in a folder you can transpose the chorus by a semitone using the playback parameters of the folder without throwing your drums out.
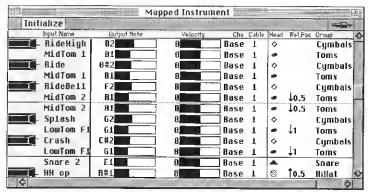
Default Score Style
The bottom line is where you set the Score Style, which is automatically applied to any sequence recorded with the right instrument. For mapped instruments, when used in conjunction with the "mapped score styles" this can be used to automatically generate drum notation. Of course the sequence can be assigned a different Score Style in the Score window.

7

Mapped Instrument Window

To open the mapped instrument window, double-click on any mapped instrument. The input notes are aligned horizontally, and their parameters are aligned vertically..

Input Name	Output Note	Velocity	Cha	Cable	Head	Rel.Pos	Group
RideHigh	B2	0	Base	1	◇		Cymbals
MidTom 1	B1	0	Base	1	●		Toms
Ride	0#2	0	Base	1	◇		Cymbals
MidTom 1	B1	0	Base	1	●		Toms
RideBell	F2	0	Base	1	◇		Cymbals
MidTom 2	A1	0	Base	1	●	↓0.5	Toms
MidTom 2	A1	0	Base	1	●	↓0.5	Toms
Splash	G2	0	Base	1	◇		Cymbals
LowTom F1	G1	0	Base	1	●	↓1	Toms
Crash	C#2	0	Base	1	◇		Cymbals
LowTom F1	G1	0	Base	1	●	↓1	Toms
Snare 2	E1	0	Base	1	▲		Snare
HH op	A#1	0	Base	1	⊠	↑0.5	HiHat

Monitor Keyboard (Selecting Notes)

The monitor keyboard on the left represents the input notes. It can be played by clicking on it. You can also select individual notes or note ranges by dragging the mouse over the notes you want. To select more notes, click them while holding down the ⌘ key. Any value alterations will apply to all selected notes.

Input Name

In the next column, you can click on the input note and give it a name of up to 12 characters. You can initialize the names of the selected notes to the normal note descriptions (like C#3) by choosing **Initial-ize > Names as Notes** or to the sound names of the notes according to the GM Standard by choosing **Initialize > Names as General MIDI**.

Output Note

This column is where you set the output note; either as text by double-clicking on the note description, or graphically, by horizontally moving the beam. Every time you alter the value, MIDI notes are output so you can hear the output value. If you choose **Initialize > Output Notes**, the output notes of the selected pitches are set to the same as the input notes.

Velocity

This is where you set a velocity offset, i.e. a set value which is added or subtracted. You can either grab the number and use the mouse as a slider, or click the beam at the desired point. The starting point is mid

velocity (64), as sent by non velocity-sensitive keyboards. **Initialize > Output Velocities** neutralizes all velocity offsets.

Cha

Here you set the MIDI channel of individual notes from 1-16 to allow you to play individual sounds from a different drum set in the same sound generator. Normally you will use the *Base* setting here. This means that the notes are sent on the channel set in the mapped instrument's object parameter box. If you choose *All* instead of 1-16, the channel information of the input notes is retained. This is useful if you want to insert the mapped instrument in the signal path after a multi-instrument or standard instrument. To set all selected notes to *Base* choose **Initialize > Output Channels**.

Cable

You can send individual notes from the mapped instrument object to a different output cable to enable you to play sounds from a different sound source. Of course, you have to have connected more than one mapped instrument output (you can go up to 16) first. **Initialize > Output Cables** sets all selected notes to the highest no. 1 cable.

The last three columns determine the notation parameters of the individual input notes or drum instruments. Choosing **Initialize > Score Parameters** neutralizes the settings for the *Head*, *RelPos.* and *Group* parameters.

Touch Tracks

Touch Tracks turns LOGIC into an interactive "live" sequencer. A touch tracks object allows you to assign different MIDI notes to various sequences or folders which can then be played by these notes. (In the following section, any references to "sequences" means folders as well).

(Touch Tracks)

To create a Touch Tracks object, drag a sequence or folder from the Arrange window into the Environment window or choose **New > Touch Tracks™**. You can even drag the Touch Tracks object straight from the Environment window onto a track in the Arrange window to audition it. Don't forget that:

- the Touch Tracks only work (like delays or arpeggiators) when the sequencer is running.

- for system-related reasons playback is interrupted whenever the sequencer begins a new cycle.

All the relevant touch tracks parameters can be set in the Touch Tracks window. You open this by double-clicking on any Touch Tracks object.

Sequence Note Assignment

Dragging a sequence into the Environment initializes a Touch Tracks object, so that initially all notes are allocated to this sequence. In the *Input* column you can see the input notes, and to the right, in the *Sequence/Folder* column, the names of the assigned sequences or folders. On the vertical keyboard to the left, you can select individual notes or whole pitch ranges, by grabbing and dragging. If you then drag a sequence from the Arrange window, it will only be assigned to the selected notes.

Remember that with the following parameters, all settings also apply to multiple selections.

A vertical gray line means that the setting of the field above has been adopted.

Group

To the left of the sequence name is the group column. Here you can assign individual sequences to one of 99 different groups in which only one sequence can ever be played simultaneously. This means that when you start to play a new sequence any other sequence being played from the same group stops immediately, as with hi-hat mode in Hyper Edit.

The *off* setting means that the sequence is not assigned to any exclusive group and can be mixed with other sequences.

Transposition

In the *Trp* column to the right of the sequence name, you can see how the sequences are transposed relative to one another. If you drag a sequence onto a selected key range, the input note on which you play the sequence is set to the original pitch, and the other notes are transposed according to their position relative to this input note. Initially when you drag the sequence into the Environment, C3 is the pitch, but you can of course alter the transposition of any individual sequence.

Velocity Sensitivity

In the *Velocity* column, you can set how much the velocity values of the played sequences are affected by the velocity value of the trigger note: by *100%, 50%* or not at all (*off*).

Trigger Modes

In the column on the right you can define the trigger mode:

Multi	Regardless of note off events, the sequence is always played to the end. Every trigger note starts playing the sequence.
Single	Like multi, except that a sequence stops whenever the same trigger note is played again.
Gate	The sequence is only played for as long as the input note is held down. Note off stops all notes.
Gate Loop	Like gate, except that the sequence is played repeatedly until there is a note off.
Toggle	A trigger note starts the sequence which runs until another trigger note stops it.
Toggle Loop	Like toggle, except that the sequence is repeated until another trigger note stops it.

Start

In this column you can quantize how sequences start and stop. *Free* means there is no quantization. The *next 1/16, 1/4* or *1/1* settings start or stop the sequence at the next 1/16 or 1/4 note or at the start of the next bar.

Delay

In this column you can assign the sequence a delay. As in the sequence parameter box, the delay is set in the right side of the column in ticks or in the left side in note values.

Multi-Instruments

To create a new multi-instrument, choose **New > Multi Instrument**.

A multi-instrument consists of up to 16 sub-channels. Each of these sub-channels has a complete set of instrument parameters, but the name, MIDI channel and output are determined by the multi-instrument. All sub-channels also use a common table of 128 sound program names in up to 15 banks, and a common format for the bank select message.

A multi-instrument is thus preset to be a virtual display of a modern multitimbral sound source.

Multi-Instrument Parameter Box

Once you have created a multi-instrument, you will see the multi-instrument parameter box shown here.

You should already be familiar with the meaning and operation of the individual parameters (if not refer to the description on page 7 - 18). The settings made here apply to all sub-channels and are therefore only any use for tests. Normally the channel should remain set to *All*, so that the sub-channels retain their channel information. The direct output assignment *M0* should be replaced by manual cabling or by setting the correct port number (see also page 7 - 9).

Initializing and Selecting Sub-channels

To select a sub-channel click the appropriate button on the multi-instrument object. The first time you click it, the sub-channel is initialized, i.e. it appears with its icon in the Arrange track list. To make things clearer you should only initialize as many sub-channels as you need. As with standard instruments, you can remove sub-channels from the instrument list by unchecking the icon box. The button for that sub-channel will then be shown with a diagonal line through it. If you want to deselect all the sub channels and select the multi-instrument, click on the top edge of the multi-instrument, or next to the icon.

In the diagram, sub-channel 1 is selected, sub-channels 1-8 are initialized and 9-16 have been removed from the instrument list.

(Multi Instr.)

The Sub-channel Parameter Box
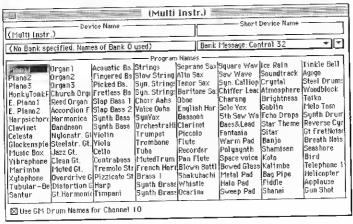
This is the same as for a standard instrument, and can therefore also be assigned its own icon and color. However, if you try to alter the MIDI channel, the following message will appear: "Channel protected! Please select a sub-channel from the Instrument flip menu."

Cabling

To connect the output of an Environment object directly to the input of a sub-channel, hold down the ⌨ key and connect it the via the flip menu (see the section *Cabling between Layers* on page 7 - 12).

Multi-Instrument Window
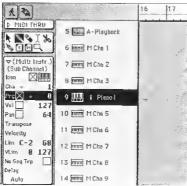
Double-clicking on a multi-instrument opens the (go on, you'll never guess) multi-instrument window.

Name and Short Name

In the top left, under *Device Name*, you can enter the full name of the multi-instrument. In the top right, under *Short Device Name*, you can also enter a short name. This short name saves space in the Arrange window track list, particularly if the program name is displayed too. The short name begins right next to the icon. If you want a uniform display, leave a space in front of the short name.

Depending on whether or not you have checked the sub-channel's *Prg* box, the following information will appear in the Arrange window track list:

• the name of the multi-instrument & channel number (if the box is not checked), or

• the short name, channel number and program name (if the box is checked).

Program Names

There are 128 program names in the multi-instrument window. A total of 15 banks of 128 sound names are available. There are several ways of entering the program names:
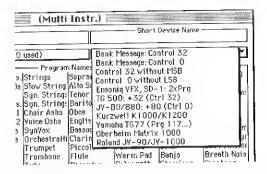
• by double-clicking on the name (via the text input field),

• by copying via the clipboard from a different multi-instrument or from a word processing program. The clipboard functions for a whole sound bank are available in the text import flip menu (downwards arrow in the top right). First copy the program numbers or General MIDI names onto the clipboard and add them to the word processing software. You can then edit the names and copy the whole section back again.

• if you want to use program numbers instead of names, choose **Init Names as Numbers** from the text import menu.

• if you want to use General MIDI program names, choose **Init General MIDI Names**.

• if you have **EMAGIC**'s SoundSurfer librarian or SoundDiver editor software: start SoundSurfer or SoundDiver, switch back to

LOGIC and choose **Update Using Autolink**. The current program names of all your sound sources will then appear automatically.

If the *Use GM Drum Names for Channel 10* box at the very bottom is checked, the standardized GM names for drum sets will be shown in the multi-instrument window for sub-channel 10.

If the *Prg* box in the selected sub-channel's parameter box is checked, you can send a program change message immediately by selecting a program name (either click on it or select it using the cursor keys).

Banks
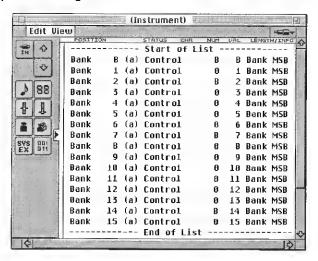
On the left above the program names, you can choose one of 15 sound banks (0-14) via a flip menu. The top item ("No Bank specified. Names of Bank 0 used.") can be used if that particular sound generator does not understand bank select messages, or only has 128 sound programs. Bank 0 is always initialized. The first time you choose one of the banks 1-14 you will be asked whether you want to initialize this bank. Press ⏎ or *Cancel* if you do not want to initialize the bank. Non-initialized banks do not have their own program names, but use the names of the equivalent program numbers from bank 0. You should only initialize additional banks if you want to enter program names as well.

In the flip menu on the right you can define the MIDI message which is sent when you switch banks on this multi-instrument. Unfortunately, there are several different formats, depending on manufacturer. Please refer to the manuals for your devices to see whether they support bank select messages and if so, in what format. With modern synths, there is a good chance the format will be one of the top items in the flip menu: either controller# 32 or controller# 0. If your synth does not follow this standard, don't give up — all is not lost!

Defining Your Own Bank Select Commands

You can now create a string of as many events as you wish — even a Sysex message of any length — to call up each individual bank, whether from a single Instrument, a mapped Instrument or a multi-Instrument. So, whenever you change bank manually, or send a standard bank change from LOGIC, all the events you set up to change banks on your individual synths — whatever standard they follow — are transmitted as well.

To use this function, select the standard, mapped, or multi-Instrument you require, and choose **Options > Define Custom Bank Messages...** . A window similar to the event list will open, with 15 preset sample event strings.

```
                              (Instrument)
   Edit View
             POSITION           STATUS   CHA   NUM   VAL   LENGTH/INFO
   ⬆        ------------- Start of List -------------
   ⬇        Bank      B (a) Control      B    B  Bank MSB
            Bank      1 (a) Control      0    1  Bank MSB
            Bank      2 (a) Control      B    2  Bank MSB
   ♪  88    Bank      3 (a) Control      0    3  Bank MSB
            Bank      4 (a) Control      0    4  Bank MSB
            Bank      5 (a) Control      0    5  Bank MSB
            Bank      6 (a) Control      B    6  Bank MSB
            Bank      7 (a) Control      B    7  Bank MSB
   SYS 001  Bank      B (a) Control      0    B  Bank MSB
   EX  011  Bank      9 (a) Control      0    9  Bank MSB
            Bank     10 (a) Control      0   10  Bank MSB
            Bank     11 (a) Control      0   11  Bank MSB
            Bank     12 (a) Control      0   12  Bank MSB
            Bank     13 (a) Control      0   13  Bank MSB
            Bank     14 (a) Control      B   14  Bank MSB
            Bank     15 (a) Control      0   15  Bank MSB
            ------------- End of List -------------
```

You can create any MIDI event here in exactly the same way as you would in the Event Editor, by cutting, copying, inserting and editing. The only difference is that you enter the bank number you want instead of a time position.

A letter will appear behind the bank number in brackets. This letter allows you to set the order in which the events you have defined will be sent.

For example:

```
POSITION           STATUS   CHA   NUM   VAL   LENGTH/INFO
------------- Start of List -------------
Bank      1 (a) Control           32    1  Bank LSB
Bank      1 (b) Control      B     0  Bank MSB
Bank      1 (c)    $FB       $29 $0A
```

Here the Bank Select command "Bank 1" has been set up to send three events: first, (a) controller #32 message with the value 1, then (b) controller message #0 with value 0 and finally, (c) a Sysex message for a device from 80s digital synth pioneers PPG ($29).

You can send a string of events to switch each bank, and they can be as long as you like. If there are no events defined for a particular bank, a standard Bank Select message will be sent for that bank instead. The bank mapping information relates to the selected instrument and can be cut and pasted with it.

The MIDI channel for the event string you're transmitting is worked out automatically — or, if the object is set to "All" channels, the string is sent out on the same channel as the incoming bank change. This feature is useful for multi-instruments, as you only have to create your bank message map once, and you can then access all MIDI channels with it.

It would seem that every manufacturer is coming up with their own format for the bank select command. We hope that this handy function provides a permanent solution to the Bank Select problem.

On multi-instruments, the Bank Select message (whether it's a standard controller or a string of events you've set up) is also used by Sound Diver if the Autolink is switched on, so (for example) it can request the program names in the current bank.

Keyboard

You can create a virtual keyboard by choosing **New > Keyboard**.

Keyboard

This can be used to generate test notes. Connect the output of the keyboard to an instrument, port or the sequencer input. In the latter case you could theoretically record whole songs without a master keyboard although no dynamic information (MIDI velocity data) will be recorded.

Apart from the standard parameters you can also enter the MIDI channel and velocity value of the notes produced (unfortunately Apple has not yet come up with a velocity-sensitive mouse) as well as the octave register of the bottom C.
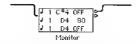
You can define the note range by dragging the bottom right corner. To select or move keyboards, hold down the 🔲 key and grab the bar to the right of the name field.

Apart from playing symphonies with your mouse, the keyboard can also be used to display note events. Connect the output of any object (e.g. an instrument or physical input) to the keyboard, and enjoy the flashing lights...

Monitor

To create an event monitor, choose **New > Monitor.** This shows the events arriving at the monitor's input on the bottom line; previous data is pushed upwards as new information arrives. By grabbing and dragging the bottom corner you can set the size of the monitor (up to 32 event lines).

All data arriving at the input of the monitor is rerouted unaltered to its output. You can therefore "insert" monitors anywhere for testing.

Arpeggiator

To create a new arpeggiator, choose **New > Arpeggiator.**

(Arpeggio)

You can use this to break down chords into runs of notes. Connect the output of the arpeggiator to the instrument that you want to play the arpeggios. Set the arpeggiator for the selected track in the track list of the Arrange window. (Of course, you could insert the arpeggiator at any other point in the signal path.)

You can then play the arpeggiator "live" or using recorded sequences. Bear the following points in mind:

- The arpeggiator only works when the sequencer is running.

- Playback is interrupted at the end of a cycle for system-related reasons.

An arpeggiator has the following parameters (the numbers in brackets will be explained below at the parameter *CTRL Base*):

Direction (+0)
The direction of the arpeggiated chord:

Up	upwards
Down	downwards
UpDn	upwards and downwards (top/bottom notes play twice)
Auto	the direction depends on the order of the recording
UpD2	upwards and downwards (top/bottom notes play once)
Rand	random order
All	all notes repeated simultaneously as a chord

Vel (+1)
Velocity values of the arpeggiated notes.

1 - 127	fixed velocities
Orig	the velocities of the recorded notes are retained
Rand	random velocities between 1 and the original value

Lim (Law: +2, High: +3)
This is where you can delimit the pitch range (between *C-2* and *G8*), within which the chords are arpeggiated. Any chord notes outside this range are unaffected.

Res (+4)
This is where you set the rhythmic note value of the arpeggio via the flip menu shown on the left. *None* = arpeggiator switched off.

Len (+5)
This is where you define the length of the arpeggiated notes. The *Orig* setting means that the lengths of the recorded notes are retained.

Snap to (+6)
This value determines the grid value according to which the arpeggiator begins outputting the arpeggio after the incoming notes. With "normal" arpeggios it is useful to use the same setting as the bar denominator (e.g. *1/4*).

Repeat (+7)
On continues the arpeggio for as long as the chord is held down. *Off* finishes the arpeggio after one run.

Octaves (+8)
The arpeggio can be spread over *1-10* octaves.

Crescendo (+9)

The velocity value set here (*-99* to *+99*) is added every time the arpeggio is repeated (provided *Repeat* is set to *On*, of course).

Ctrl Base

All 10 parameters of the Arpeggiators can be remote controlled by controller events. With the parameter **Ctrl Base** you can determine the controller number for the first parameter (Direction). The other parameters will be controlled by the subsequent following controller numbers. To find out which controller number will be used for a certain parameter, add the number in brackets behind the parameter's name to the Base number. The remote control will be deactivated if switched to position *Off*.

Transformer

You can create a new transformer object by choosing **New > Transformer**. This allows you to alter every component of a MIDI event in real time.

Transformer

Before it can carry out these transformations, the transformer has to be placed in the MIDI signal path, e.g. between the instrument and the port.

Working Principle

The transformer first checks whether the event corresponds to a defined **condition**. If it does the defined **operation** is carried out on this event. Depending on the **internal signal path** the transformed and/or other events are output.

Transformer Dialog Box
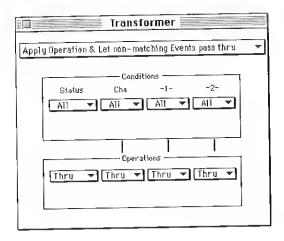
Double-clicking on a transformer opens its transformer dialog box where you can make all relevant settings.
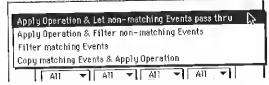
You can also open this box as a floating window, by double-clicking on the transformer whilst holding down the ⌥ key.

Internal signal path

In the top box, you can set the transformer's internal signal path via the following flip menu.

Apply Operation & Let non-matching Events pass thru

MIDI events which conform to the condition are processed. MIDI events which do *not* conform to the condition are let thru. This is the default setting.

Apply Operation & Filter non-matching Events

MIDI events which conform to the condition are processed. MIDI events which do *not* conform to the condition are *not* let through.

Filter matching Events

All MIDI events which match whatever the condition is are filtered out.

Copy matching Events & Apply Operation

All MIDI events which conform to the condition are copied and the copy is processed. The original *and* processed copy, plus any MIDI events which do *not* conform to the condition, are let thru.

Conditions and Operations

The conditions and operations are basically the same as for the transform window. The only differences arise from the fact that transformer objects work in real-time. Consequently, it is impossible to define conditions for positions or note lengths in the transformer dialog window.

The remaining parameters are covered in Chapter 13 *The Transform Window*.

Pitch Bend editing

The transformer can process 14-bit pitch bend events: if byte 1 is changed (e.g. by addition or scaling), the change will affect the second byte too. So, set Byte 2 to "THRU" when you process.

Remote Controlling the Condition and Operation Values

The value(s) of any transformer conditions or operations can be externally controlled using meta events.

- Meta event #127 defines the first operation value,

- Meta event #126 defines the second operation value (if available).

- Meta event #125 defines the first condition value.

- Meta Event #124 defines the second condition value (if available).

You can either add these meta events to an event list, or create them with a fader object. You set the *Out* definition in the parameter box to *Switch/Meta* and the data byte -1- to a value between *124* and *127*, depending on the effect you're after.

You can create the necessary faders for this in the Environment by selecting **New > Fader > Special > Transform Operation Par.1/2** or ... > **Transform Condition Min/Max** .

Remember that you can remote-control the fader with any controller using its *In* definition; the controllers you set up (whichever they may be) then govern the transformer's condition and/or operation values .

Delay Line

To create a new delay object, choose **New > Delay Line**.

=◷➔ ▷
(Delay Line)

This object allows you to repeat any MIDI events like a delay. Note events can also be altered in pitch and velocity. Connect the output of the delay object with the instrument that you want to play the delayed events. Set the delay object for the selected track in the Arrange window track list. (Of course, the delay could be placed at another point in the signal path.)

You can now play the delay effect "live" or via recorded sequences. Bear the following points in mind:

- The delay only works when the sequencer is running;

• Playback of the delayed events is interrupted at the end of a cycle for system-related reasons;

• Every repeat uses up one voice on your sound source!

Parameters

A delay object has the following parameters:

Thru Original: if this box is checked, the original signal is let thru, otherwise it is removed.

Repeats: number of event repeats (*1-99*). Setting *0* = delay switched off.

Del: the delay time between the individual repeats. The left value is in divisions and the right value in ticks.

Trp: the transposition of note events per repeat (*+/- 99* semitones).

Vel: the change in the velocity values of note events per repeat (*+/- 99*).

Output Cable

The first repeat is always sent via the top output cable. If several cables have been connected, every following repeat is sent via the next output cable down. If there are no more outputs lower down the delay continues via the top cable.

Voice Limiter

To create a new voice limiter, choose **New > Voice Limiter**.

The voice limiter allows you to limit the number of simultaneously played notes in a MIDI signal. Connect the output of the voice limiter to the instrument whose simultaneously played notes you want to limit. Set the voice limiter for the selected track in the Arrange window track list. (Of course, you could place the voice limiter at a different point in the signal path, e.g. between the instrument and the port.)

Voice Limiter

Parameters

Voices: this is where you define the maximum number of simultaneously played voices from *1-32*.
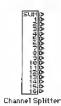
Priority: this is where you define which notes are let through if the voice limiter simultaneously receives more notes than the maximum set under *Voices*. *Top* = the highest notes are played. *Bot* = the lowest notes are played. *Last* = the most recently received notes are played.

Channel Splitter

To create a new channel splitter, choose **New** > **Channel Splitter**.

You can use the channel splitter to reroute MIDI events to different cables according to their MIDI channels. Every MIDI event received at the input of the channel splitter is rerouted to the output corresponding to its MIDI channel. If there is no cable connected there, the event is rerouted to the SUM output (at the top). The SUM output carries the events of those channels which are not rerouted to the individual outputs.

Channel Splitter

If you want to route the information on a separate channel to other objects please refer back to section *Multiple Cabling* on page 7 - 12.

Chord Memorizer

To create a new chord memorizer, choose **New** > **Chord Memorizer**.

Chord Memorizer

You can use this object to transform each of the twelve semitones into a chord consisting of a maximum of twelve voices. The octave register of the chord depends on the octave register of the incoming note. Connect the output of the chord memorizer to the instrument that you want to play the chords. Set the chord memorizer for the selected track in the Arrange window track list (e.g. by clicking the chord memorizer in the Environment with the MIDI Thru tool).

Object Parameter Box

Cha: this is where you define (from *1-16*) the MIDI channel of the chord notes produced.

Lim: this is where you set the pitch range (from *C-2* to *G8*) within which the chord memorizer reacts to incoming notes by outputting chords. Notes outside the range are passed through unaltered. The pitch range of the chords is not affected by these settings. Default setting: *C2-C4*.

Trp: the chords produced can be chromatically transposed by this parameter (+/- 99 semitones).

Key: this parameter is used to determine the key signature *before* defining the chord (from *Cb* to *C#* in fifths). By adjusting this parameter you can transpose the entire chord definition to a different key in harmonically correct fashion. Default setting: *C*.

If you forgot to set the *Key* before the chord definition, just set the key for transposition here, which is as far from the default value of C as your transposed key is from the original. You won't forget it next time!

EMAGIC
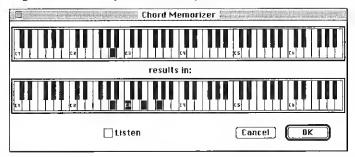
If you want to place the same chord memorizer passage in different transposed parts of a song you have to copy the chord memorizer object for the different parts of the song, set the correct *Key* for each transposition and play the transposed passages with the adjusted chord memorizer. (If this sounds complicated, that's because it is).

It is easier to connect the output of the chord memorizer to the sequencer input and record the chord data in sections with the correct *Key* setting.

Chord Memorizer Window

Double-clicking on the chord memorizer opens the chord memorizer dialog window, where you can make up the chord definitions:

The top keyboard is for playing/ displaying the incoming note (and inputting via the mouse) and the lower keyboard is for displaying the assigned chords (and, again, inputting via the mouse).

Do remember that you can only choose notes on the top keyboard within the *Lim* range (even via MIDI), and that you can only define one chord for each of the 12 semitones. However, you *can* combine as many chord memorizers as you need.

You can switch off any notes that you have already chosen by simply clicking the bottom keyboard.

If you want to use your external MIDI keyboard for the chord definition:

- First play the "input note".

- Then click the *List* box. The bottom screen keyboard is inverted to indicate it is ready to record.

- Now any notes you play are stored as the "assigned chord" (and displayed).

• Click on the list checkbox again.

By clicking on the top keyboard or playing notes on the connected MIDI keyboard you can hear the defined chords straight away.

Physical / Sequencer Input

The physical input represents the MIDI inputs on your Macintosh's MIDI interface, and the sequencer input symbolizes the LOGIC's MIDI input. Both objects are only available once in the Environment.

To create these objects, choose **New > Physical Input** or **New > Sequencer Input** but only if you have accidentally deleted them. If they exist already, these functions just bring the objects to the current layer. The cabling is unaffected.

Physical Input

The physical input object has a total of 65 outputs. The bottom 32 outputs are labeled P1 to P32. This is where the individual MIDI signals are received from the maximum 32 inputs of the MIDI interface connected to the printer port. M1 to M32 carry the MIDI data from the individual inputs of an interface connected to the modem port.

The top output (*SUM*) outputs all MIDI signals which are not dealt with via the individual outputs.

Sequencer Input

MIDI events arrive at the sequencer via the sequencer input object where they can be recorded on the current track and (via the MIDI Thru) be rerouted to the track instrument. As with all Environment objects, you can connect several signal sources to the sequencer input which can then be mixed together.

Normally the SUM output of the physical input is directly connected to the sequencer input, so that all incoming MIDI events can be directly recorded.

If you want to alter incoming MIDI events before they are even recorded you can place various objects in the signal path between the physical input and the sequencer input.

MIDI Metronome Click

The MIDI metronome click object creates note events in time with the running sequencer, providing the metronome button in the transport panel is switched on. LOGIC allows you set this switch separately for playback and recording.

By choosing **New > MIDI Metronome Click** you can create a maximum of one MIDI metronome click object. If one already exists, it is moved to the current layer.

The checkboxes after *Bar, Beat* and *Division* allow you to generate different note events separately for bars, beats and divisions. The *Cha, Note* and *Vel* parameters define the MIDI channel, note # and velocity of the generated notes. With the top *Cha* parameter you can make the settings for a direct output assignment.

Internal

"Internal" objects include instruments that are located inside your Macintosh (such as the Nubus card and/or software). Although communication with sound sources inside the computer does not actually occur via MIDI, it still conforms to the MIDI communication protocol. Internal objects have an input but no output. They therefore act like extra ports which are hard-wired to the relevant sound generator.

Using internal objects

If you want to address internal sound sources, you must first create an equivalent internal object (see below). Then create an instrument (or better still, a multi-instrument) for each MIDI channel. Now connect the output of the multi-instrument to the internal object. By then choosing one of these sub-instruments in the track list, you can play the internal sound source.

In the internal object's parameter box, you can use the *Which* parameter to choose between several (up to *16*) of these internal sound sources, if you have more than one. If you don't, choose the setting *1*.

Digidesign SampleCell

Digidesign's SampleCell II comprises a Nubus card and editor software with a 32-voice sample player for samples in the SoundDesigner II format. It has 8 individual outputs (with 16-bit converters) and can be upgraded to 32 MB of sample RAM using 30-pin 4 MB SIMMs.

7

To create a virtual representation of the SampleCell II card choose **New > Internal > SampleCell**.

The options for the SampleCell II card are similar to those of any good stand-alone sampler. Because there are no delays due to MIDI transfer or decoding, the timing is so superior to that of external MIDI sound sources that it is a good idea to set small delay values for this type of (multi) instrument.

Apple QuickTime

QuickTime™

The QuickTime 2.0 system expansion is a software GM sound generator. The "QuickTime™ Musical Instruments" file must be placed in your System folder for it to work.

To create a virtual representation of the QuickTime synth, choose **New > Internal > QuickTime**.

This software synth is 16-part multitimbral. As usual, you can switch sounds via program changes; these are arranged according the GM table. Channel 10 is always switched to drum sounds, with GM key assignments. The QuickTime synthesizer reacts to notes and program change commands, as well as to pitch bending (+/- 2 semitones) and the main volume controller (#7).

The first note is used to initialize the relevant MIDI channel of the QuickTime synthesizer and therefore is not played.

Note:

• Don't expect too much in terms of sound quality from the Quick-Time synthesizer. It is not intended for use in professional productions.

• The QuickTime synthesizer has a noticeable delay due to its hardware and the number of initialized MIDI channels. You can compensate for the delay by setting negative de*lay* values in the object parameter box of the relevant (multi) instrument.

Morning Star MacWavemaker

LOGIC can now control Morning Star's MacWavemaker soundcard directly. You can create a virtual representation of MacWavemaker in the Environment window by selecting **New > Internal > Wave-Maker**.

Modem Port / Printer Port

Modem or printer port objects represent the MIDI output(s) of a MIDI interface connected to the modem or printer port.

If you want to address several MIDI outputs separately, you have to use an interface which is compatible with Mark Of The Unicorn's MIDI Time Piece (like MIDI Express or Opcode Studio 4 or 5). Only this kind of interface will allow you to activate the *MTP Cable Mode* checkbox (**Preferences > Communication**).

Then create a port object for each output of your interface.

To create a port object choose **New > Modem Port** or **New > Printer Port**.

You can use the lowest line in the parameter box to set the MIDI output (*1-99*) for the port object. The signals from all the MIDI cables which you plug into this object will then be sent via the MIDI output you've chosen. The *All* setting means that the incoming MIDI signals are sent simultaneously via all outputs of the MIDI interface.

7

MIDI interface with only one MIDI port
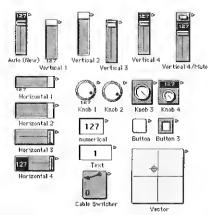
If your MIDI interface has just one MIDI port set the port object to *MTP port 1* or *All*. You still have the option of connecting a second independent MIDI bus to the other Macintosh port (printer or modem).

7.5   Faders

A fader can generate all sorts of MIDI events by altering a variable data byte with the current position of the screen fader. You can adjust its position by grabbing it with the mouse and use it to remote control any MIDI events with a variable data byte.

To create a new fader, choose **New > Fader > ...** . A sub-menu appears where you choose the fader type you want. The key command equivalent always creates an "Auto" type of fader. Such faders change appearance according to their size (and function). Try creating a new fader in this way and resizing it. You should notice that if you shrink the fader beyond a certain point, it will turn into a knob automatically. Also, if you resize the fader so that it is wider horizontally than it is long (vertically), it will automatically become a horizontal fader.

By defining the *Fader Type* ,you can choose from among a range of pre-set fader types which have a variety of functions . However, you can al-so define the effect a fader has independently, by setting the *Fader Function*; normally this will be the type of event it creates or what event types are cabable of remote-controlling it. A specialized fader function allows you to switch signal paths. There is a special case: when set to the "Auto" fader type, the "cable switcher" fader function also determines its appearance, but is also available for other types of fader.

Operation

Normally you grab the surface of a fader with the mouse pointer or pencil and drag it vertically or horizontally, depending on what type it is. Knobs can be dragged both vertically and horizontally. Types *1*, *4* and *Numerical* display the generated data byte as a number. You can grab this number and use the mouse as slider. The advantage of this is that the minimum unit is 1, regardless of the size of the object. Text faders are either operated in the same way or via a flip menu (depend-ing on their parameter). Buttons can be switched by clicking them. To adjust the cable switcher output, either click a cable or grab it and drag it vertically.

Even if the faders are small, you can change the values in units of 1 by simply moving them while holding down ⌃.

Useful functions for Object Groups

If you want to create a virtual mixing desk or synthesizer control panel in the Environment, you often have to deal with large groups of fader objects which have the same size, regular spacing and/or a similar def-

inition. To save time with the definition and alignment of these groups, LOGIC offers several helpful functions.

How you go about it

The idea is that you define (one or more) objects as *prototypes (templates)* by copying them onto the clipboard (**Edit > Copy**). Certain prototype parameters can then be applied to selected objects.

Size and Alignment

The function **Options > Apply Buffer Prototype to > Size** allows you to transfer the size of the prototypes to the selected objects.

To align a group of objects, choose 4 objects in 2 rows and 2 columns whose horizontal and vertical alignment you want to transfer to the group, and copy them into the clipboard. You can then transfer this alignment by choosing the function **Options > Apply Buffer Prototype to > Position** and the selected objects will be positioned in the top left corner, in the same way as in the prototype.

Options > Apply Buffer Prototype to > Position and Size combines both the above functions.

Definition

The function **Options > Apply Buffer Prototype to > Definition** transfers the parameters of a suitable prototype to all selected objects. If several prototypes of the same type are available, the one with the most similar size is used.

... to > Definition, channel increment increases the channel number from object to object (in and out definition) beginning with the top left object.

... to > Definition, number increment likewise increases the first data byte of the definition (controller #).

Cabling serially

Using **Options > Cable serially**, you can connect up a group of selected objects in series, beginning with the object on the top left.

Names with Numbers

Remember that when naming multiple selections an increasing number is placed at the end of the name of each object.

Special Functions for Faders

Grouping Faders

If you grab one of several selected faders and move it, all the selected faders will also be moved proportionally. As long as you don't change the grabbed fader, the proportional positions of the faders are retained, even after one or more of the faders have reached extreme positions.

Instead of the proportional movement, there are two options:

Moving the fader group with the ⌘-Key pressed changes all values linear (the absolute value differences are maintained).

Moving the fader group with the ⇧⌘-Keys pressed brings all faders to the same value.

Sending Fader Values

You can use the functions **Options > Send All Fader Values** and … > **Send Selected Fader Values** to make all fader objects or all selected fader objects send their current values. This function is particularly useful for virtual mixing desks or synthesizer panels, as it allows you to take a "snapshot" of all current fader positions. However, you can only use *Send All Fader Values* to record faders whose outputs are connected to objects. The option *Send All Fader Values after loading* in the **MIDI Options** page of the **Song Settings** causes all fader values to be automatically sent after a song is loaded.

Resetting Fader Values

With the key command *Reset Selected Faders* all selected faders are set to zero and transmitted.

Recording Fader Movements

If you want to record the data generated by a fader you don't need any special cabling. All data generated by faders can be recorded on the selected track.
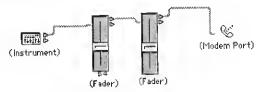
N.B: Events are recorded in accordance with the »Out Definition«.

Playing Back Fader Movements

If, when you play back recorded fader data, you want the relevant fader to move accordingly, the fader has to be located after the track in the signal path. It must therefore either be set as a track instrument, or be in the signal path between the track instrument and the port.

If you want to connect a group of faders so that their recorded movements are visible during playback, it is useful to create an instrument for this fader group. This instrument can then be used as the track instrument when recording the fader movements. All the faders will now be connected serially, beginning with this instrument (see section *Cabling Serially* on page 7 - 13). The cable then leads from the last fader to the desired port.

The movement of the faders will follow all the events that match the input and output definitions.

If you don't need an instrument's special parameters, you can use a transforrmer instead. If you're using big mixers, you'll probably also need a channel splitter if you're to get all the signals flowing to all the different channels.

Fader Types

The fader type is shown in the line under the familiar icon functions, and can be altered via a flip menu.

The fader type mainly just determines the way a fader looks. The kind of events it generates has nothing to do with its appearance.

Fader types 1 and 4 are equivalent to types 2 and 3 but have an extra numerical display. The particular features of the individual types of faders are covered below.

Vertical | Mute

Vertical 4/Mute

These are the same as fader type 4, with a mute button. When you press the mute button, the fader sends an event (in accordance with its

output definition) with the data byte *0*. If the mute button is pressed down, the fader movements are not sent. When you switch off the mute button, the current fader value is sent.

Numerical

127

numerical

This type of fader displays the current second data byte numerically.

Buttons

Button Button3

Button Button3

These faders function as straightforward switches. If the button is not pressed in (button 3) or is gray (button 1) this means it has sent an event according to the output definition with the data byte "left range value" (minimum). When pressed in (button 1 will then be white or colored and crossed) an event with the right range value (maximum) is sent. If you set both range values simultaneously, the fader acts as a key. In this case, the fader always looks as if it has not been pressed in. When you click on it, it looks briefly like it has been pressed in, and send the defined event with the range value as a data byte.

Please do not confuse the "button" type of fader with the "switcher" fader function: a Button can create any kind of event, but a fader on the cable switcher only determines which output an incoming signal will be sent to.

Text

Text faders function like *Numerical* faders, but can display text for each of the 128 data byte values. Double-clicking on the surface of the text fader opens the text fader window..

By double-clicking on a value here, you can enter text via the usual text input box. The data byte values are preset for use as text.

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Clipboard Functions

The down arrow flip menu in the top right allows you to access the cut, copy and paste clipboard functions for all text. You can also edit the individual blocks of text in an external word processing program. The first 128 lines containing text are added starting at the front, and any spaces are ignored. If you want empty lines, insert at least one space.

Behave as menu

If there is a check in the *Behave as menu* box, this means that when you grab a text fader, a flip menu will open containing all the relevant blocks of text. When you choose a particular block, an event is sent (in accordance with the output definition), and the data byte value is equivalent to the text. If this box is not checked, the text fader can be operated using the mouse as a slider.

Text faders whose *Range* is set to *0–1* display the value *1* name for all values apart from zero.

If you don't need all 128 entries for a particular text fader, you should reduce the range of values to just those you do need using the *Range* setting in the parameter box; this can save you a lot of memory.

Hinweis

If you want to use a text fader to show the position of a switch (which can only output values 0 or 127), select *0-1* under *Range* and type the required text into positions *0* and *1*, as all values over *1* will cause the text for value *1* to appear anyway.

Tip

Vector

Vector faders function like Joysticks: there are basically two faders arranged at a 90° angle. This means that you can set two output definitions in the vector fader parameter box: one for vertical movement and one for horizontal movement. When you move the small crosshair horizontally, only events with the horizontal output definition are sent. Please remember that:

- The output definitions for both dimensions are independent of each other. They just share the same value range.

- There is no separate input definition. If you want to transform incoming events you should use two normal faders.

- The advantage of the vector fader is that you can alter two parameters simultaneously using the mouse (e.g. volume and pan, with controllers #7 and #10).

4-Channel vector mode

This mode allows you to send MIDI events simultaneously on four con-secutive MIDI channels using a vector fader.

4-channel mode is automatically switched on whenever vertical and horizontal event definitions match.

In this mode, each corner is assigned a MIDI channel, and every move-ment sends out events on each of the four channels, the values being determined by the distance from each of the four corners. The upper left-hand corner represents the original channel, and the following channels are then assigned to the upper right, lower left and lower right corners (in that order).

For example: imagine the vertical and horizontal event definitions are set to controller #7 (volume). Each fader movement will then send the following events:

- controller #7 / channel 1, value: distance to the upper left corner,
- controller #7 / channel 2, value: distance to the upper right corner,
- controller #7 / channel 3, value: distance to the lower left corner,
- controller #7 / channel 3, value: distance to the lower right corner,

So, at the smallest distance from the corner, the value sent on that channel will be 127, and at the maximum distance (i.e. in the opposite corner), it will be 0.

Fader Functions

MIDI Events

The three parameters *Out, Channel,* and *-1-* determine the MIDI events to be sent (the output definition), while the three parameters *In, Chan-nel,* and *-1-* define events which can be used to remote-control the fad-er (the input definition). A fader therefore converts the input definition of certain events into the appropriate output definition.

The *Out* (or *In*) parameters define event type via the flip menu shown in the diagram:

Channel (*1-16*): this is where you define the MIDI channel.

-1- (*0-127*): this is where you set the first data byte of the events to be sent or remote-controlled.

Notes

You can use the -1- parameter to define the pitch in terms of note name. The fader position defines the velocity of the sent notes. It is followed by a note off message (as a note on with a velocity of 0).

P-Pressure

With polyphonic aftertouch, you can use the -1- parameter to define the pitch in terms of note name. The fader position then defines the virtual pressure on the set key.

Control Change

If you have set the *Control* event type you can choose the -1- parameter via a flip menu which displays all the controllers as numbers and names according to their standard MIDI definition. The fader position then determines the controller value.

Program Change

With program change messages, the -1- parameter defines a bank select command according to the controller 0/32 standard. When set to *0* no bank select command is sent. The fader position determines the program number.

C-Pressure

With channel aftertouch data, the setting of the -1- parameter has no effect. The current fader position is sent as the 1st data byte (channel pressure messages have only one data byte: the key pressure).

Pitch Bend

With pitch bend events you can use the -1- parameter to set the LSB (least significant byte – the data byte with the least effect on the pitch). The fader position defines the MSB. When the fader is set to the middle (value 64) there is no pitch alteration (providing -1- is set to *0*).

The *SysEx* and *Switcher/Meta* functions are described later (see both the section *Sysex Fader* on page 7 - 55, and the section *Cable switcher* on page 7 - 53).

Range

With these two parameters, you define which value the fader should send in its bottom or top position. This allows you to delimit the effective range. For buttons, the range defines the values sent when they are switched on or off. If both values are the same, the button behaves like a key.

Val as

This parameter determines the way the fader value is displayed.

Num: the fader value is displayed directly as a number *(0-127)*.

Pan: the fader value *64* is displayed as "0"; smaller values appear as negative numbers and larger values as positive numbers *(-64* to *63)*.

Hz, Oct, dB, ms: (LOGIC Audio only). These display formats are for controlling the DSP functions using the Environment faders.

Tip   If none of the display formats is suitable for a particular fader, you can create a text fader in the signal path after the first fader and set the text fader's input definition to the events sent by the first fader. This allows you to define the output text (see page 7 - 46).

Filter

This parameter allows you to filter all the data arriving at the fader in accordance with the input definition:

off: all incoming MIDI events are allowed to pass through. All events that match the input definition are converted in accordance with the output definition.

Other: all MIDI events which do *not* correspond to the input definition are filtered. All the events that match the input definition are converted in accordance with the output definition, and allowed to pass through.

Match: all MIDI events which match the input definition are filtered, all the others are allowed to pass.

All: all incoming MIDI events are filtered.

Thru: All incoming MIDI events are allowed to pass through, *except* any data coming directly from the physical input, which is filtered.

Special Faders

Despite the above heading, this section deals with special functions that can be *assigned* to any type of fader, rather than special kinds of faders themselves (as with the section on Sysex faders — see page 7 - 52). The "Switcher" and "Meta" settings have a special function: faders set to these do not send ordinary events, but (depending on how the *-1-* value is set) are either transformed into cable switchers or generate so-called Meta events, which in turn control special internal effects.

Logic

If the -1- value is between *0* and *48*, the fader becomes a cable switcher, and if it is over *49*, the different kinds of Meta events are generated.

When you create new faders, you can select these functions via **New > Fader > Specials >...** .

Cable switchers

As stated above, cable switchers are actually fader functions rather than types of fader! You can turn text faders with several outputs into cable switchers to allow you to choose output cables by name. When you set up *Auto*-type faders to be cable switchers, they take on the appearance shown here, so you can visually monitor the signal path.

Cable Switcher

When set up to act as a **Cable Switcher**, a fader will switch an incoming signal to the output number that matches the current fader position. *Auto* faders will automatically switch between only as many outputs as there are cables connected (plus the bottommost output, which always appears automatically for connecting another cable. In this setting the signal path is interrupted). The cable outputs can stepped thorugh by clicking on the fader. You can therefore address up to 128 different outputs (though normally, of course, you will connect up far fewer than this) which are numbered from the top (output 0) to the bottom. To limit the number of outputs, use the range setting on the right.

Any MIDI events that match the input definition can switch the output number. You jump to the output whose number matches the value in the incoming event. As usual, there are exceptions:

- An event with a value of 127 increases the output number. If you're on the switcher's last output when this event is received, you jump back to the first output. This is just like clicking on the fader.

- An event with a value of 126 decreases the output number. If you're on the switcher's first output when this event is received, you jump forward to the last output.

Meta Event Faders

If you set the output definition (*Out*) of a fader to *Switch* or *Meta* and the -1- parameter to a value above *49*, the fader will generate one of the following **Meta Events**. The fader doesn't need to be connected up in any special way, as Meta events control certain important functions within LOGIC.

Here's a quick summary of the values and what they mean:

49	Goto Screenset
50	Goto Song
51	Goto marker
52	Stop playback
100	Tempo Control (see the section *Realtime Tempo Fader* on page 16 - 12)
125/124	Transform Co 1/2. This controls the value of the condition in a Transformer object connected after the meta-generating fader
127/126	Transform Op1/2. This controls the value of the operation in a Transformer object connected after the meta-generating fader.

For more on Meta events 124-127, read the section *Remote Controlling the Condition and Operation Values* on page 7 - 36.
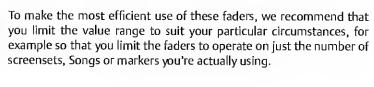
Goto Marker /Screen Set | Song

Selecting **New > Fader > Special > goto Marker** creates a fader which allows you to enter a marker number (Meta event 49); the Song position line then moves instantly to the marker with that number. The numbering of the markers rises in order throughout the song.

Selecting **New > Fader > Special > goto Screenset** creates a screenset fader (Meta event 50): you can then switch to the screenset with the number you select using the fader.

Meta event 50 has no effect within LOGIC, but you can use it to switch Songs on an external hardware sequencer.

Meta event 52 allows you to interrupt playback at any position.

To make the most efficient use of these faders, we recommend that you limit the value range to suit your particular circumstances, for example so that you limit the faders to operate on just the number of screensets, Songs or markers you're actually using.
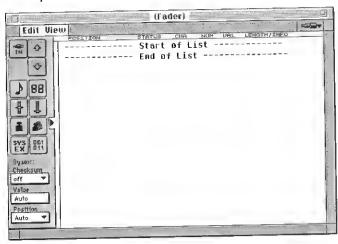
Sysex Fader

Every fader can send System Exclusive (Sysex) messages, just like any other kind of event (see the section on Fader Functions on page 48) ; so, once again, this section deals not with a particular type of fader, but a fader function that may be assigned to any fader.

Opening the Fader Event Editor window

If you set an output or input definition to *Sysex* the fader event editor window opens.

From this point on, you can open the editor by double-clicking on the word *Sysex* in the parameter box.In terms of operation, the fader event editor resembles the event list (see the section *The Event List* on page 9 - 1). However, in terms of what the settings mean, there are two differences to the event list window:

• The stored event position has no meaning in this instance;

• a data byte (normally the last one) in the selected message is replaced by the current value coming off the fader (depicted by the letters "VAL").

Creating a Sysex message

There are two ways of entering a Sysex message for controlling a sound parameter (in a synthesizer or similar device). The simple way is: your synthesizer can send the corresponding Sysex message when you alter the parameter using the operating controls.

• If you haven't already done so, connect the MIDI output of the synthesizer to the MIDI input of your computer.

• Click the MIDI In button in the top left. This signals that it is ready to receive by turning red.

- Then alter the parameter on your device. The corresponding Sysex message will be displayed, and the MIDI In button switches off automatically.

The more difficult way should be covered in your synth's manual or Sysex documentation. If you choose this way, you can consider yourself a confirmed MIDI freak.

- Click the Sysex button while holding down the ⌘ key. A Sysex message appears.

- The first data byte in the top line (directly after the word Sysex in the *NUM* column) gives the manufacturer's ID. This may be several data bytes long (since there are more than 127 manufacturers of MIDI devices).

- As for the following data bytes in the next line(s), unfortunately we can be of little help: go forth into the data jungle, Tarzan. Usually the manufacturer's ID is followed by a device type ID, an individual device ID, a data type ID (which could be several bytes), if necessary the number of the multitimbral sub channel, the identification number(s) of the sound parameters plus the value of the sound parameter (which can be overwritten by the fader).

- The last data byte of a Sysex message (*EOX*) is added automatically.

- The data bytes are normally input as decimal numbers. To enter them in hex, place a "$" in front of values when you type them in. **View > SysEx in Hex Format** allows you to see all the values in hexadecimal (for more on this, read the section on using Sysex displayed in hex, in Chapter 9). The number of data bytes in the Sysex message can be decreased or increased by clicking one of the two arrows before and after the word < EOX >.

You can only define one Sysex message per fader, either as a remote-control event *or* as an event to be transmitted. Even with the vector fader, you have to restrict yourself to one Sysex message for horizontal or vertical movements.

However, you can create more than one Sysex message in a fader Event list — and other different types of event as well (by holding down the ⌘ key and clicking on the relevant button). Then, every time you move the fader, all the events in the complete event list will be sent. You can only add the current fader position once as a data byte — and only in the **selected MIDI events**. For example, you can enter a Sysex event and a program change event in the fader event list and select the

program change event. Now every time you move the fader the (static) Sysex message will be sent, followed by the program change event, with the current fader position as a program number.

Setting the Sysex Data format

The terms "SUM" for the checksum and "VAL" for the fader value that's being sent are displayed within the Sysex string. The position and format of these bytes are set from the *"Checksum"*, *"Value"* und *"Position"* flip menus. These settings are to be found in the lower left-hand corner of the fader event list.

Only **selected** Sysex events are affected by the above parameters! This is because it's only in this sort of message that the current fader position is inserted as a data byte.

Note

Checksum format

Checksum can be adjusted to any of the following settings:

- Roland
- Yamaha
- Regular Checksum
- 2's complement
- 1's complement

If you don't know which one works with your machine, try "off" (= no checksum) first, or "2's complement".

Tip

Value byte position

Position allows you to determine the position of the value byte. This position is set from the *back* of the message; so 'last' refers to the position directly before the "EOX" ($F7) byte, while "Last-1" indicates the last place but one before the "EOX" ($F7) byte.

"*Auto*" ensures that the value byte is inserted last in the Sysex string if no checksum has been selected, or —if a checksum value *has* been entered — that the value is inserted as the penultimate byte.

Value byte format

Value can be set to the following:

Auto	The value is sent as one byte if the value range is less or equal to 127. If the maximum is set to higher than 127, the value is sent as two bytes, the MSB (most significant byte) first.
One Byte	The value is sent as one byte.
MSB/LSB	The value is sent in two bytes, with the MSB first.

LSB/MSB	The value is sent in two bytes, with the LSB (least significant byte) first.
BCD 4 LSB	The value is sent as "Binary Coded Digits" in four bytes, in the order 1,10,100,1000.
BCD 4 MS	The value is sent as "Binary Coded Digits" in four bytes, in the order 1000,100,10,1.
2 Nibbles L	The value is sent in two nibbles, with the "least significant nibble" first.
3 Nibbles L	The value is sent in three nibbles, with the "least significant nibble" first.
4 Nibbles L	The value is sent in four nibbles, with the "least significant nibble" first.
2 Nibbles M	The value is sent in two nibbles, with the "most significant nibble" first.
3 Nibbles M	The value is sent in three nibbles, with the "most significant nibble" first.
4 Nibbles M	The value is sent in four nibbles, with the "most significant nibble" first.
2 ASCII M	The value is sent in two nibbles, the "most significant nibble" first; the nibbles are sent in ASCII format for the hex value. For example, the value $7F (=127 in decimal) will be transmitted as a '7' und 'F'.
3 ASCII M	like in *2 ASCII M,* but sending in 3 nibbles.
4 ASCII M	like in *2 ASCII M,* but sending in 4 nibbles.

Note   The unused bits of the transfer in nibbles (X in 0XXXNNNN) are sent with the information on the relevant positions of the SysEx strings. If you want to transfer these deleted bits, you will have to enter zeros in the Sysex string.

Transforming Sysex messages

LOGIC only allows one Sysex string per fader. To transform one Sysex message into another, please use the following method:

• Create a fader with the Sysex message you want transformed as the input definition. Select any controller you like as the output definition.

• Create a second fader with the same controller as the input definition. Make the transformed Sysex message the output definition.

- Connect the first fader to the second.

7.6 Environment Exchange

If you have created a song on MIDI setup A and you want to play it on MIDI setup B, you'll have to make a few changes in the Environment. LOGIC offers a few functions to make these changes as easy as possible. Even if you want to play songs which you created when you were still new to LOGIC and you were not using a very large Environment or you had fewer devices, LOGIC can help you with the changes.

Automatic Adjustment

In the following standard situations, the adjustment is very easy. The method is similar in all cases:

- Open the song whose Environment you want to change.
- Open the song containing the "model" Environment.
- Switch back to the first song via the **Windows** menu.
- Carry out one of the functions described.

You can also call up the functions described in the song whose Environment you want to change. A dialog box will appear and you wil be asked to locate the "model song".

Importing Library Environments

Suppose you have acquired a device for which there is already a remote control Environment adjustment (e.g. Alesis ADAT or Yamaha ProMix 01). You want to import the adjustment into the Environment of your Autoload Song, so that it will always be available.

Choose **Options > Import Environment > Merge**. This means that all objects from the second song will be added to your current song without any objects being replaced or deleted.

Replacing an Older Environment with a Current One

Suppose you want to bring an older song "up to date" if you have made alterations to the Environment since the song was recorded (e.g. adaptations to new devices).

Choose **Options > Import Environment > Update** which adds all the objects from the second song to the current song. Objects with the same internal identification number are replaced. This allows you to add new objects from a newer Environment (the second song) to the older Environment (the current song).

Adapting a MIDI File

Suppose you're using a MIDI file with a rather spartan Environment, and want to adjust it to your normal working Environment.

• Choose **Options > Import Environment > Replace by Port/ MIDI Channel**. This replaces all objects in the current song with objects from the second song which address the same MIDI port on the same MIDI channel.

You can achieve the same effect if you have your song with your current Environment (Autoload) in the memory and you choose **File > Import**. Confirm the additional opening of the MIDI song with *Don´t close* and choose the desired MIDI file from the file selection window which appears. The next dialog box which appears asks you whether you want to create a new Environment (*New*) or copy the current one. Press ⏎ or click *Copy*.

Replacing the Environment

If you want to separate a song from its Environment to use the present Environment of a different setup (depending on the situation), there is a straightforward function available.

Options > Import Environment > Total Replace deletes the Environment of the current song, and replaces it with the Environment of a second song.
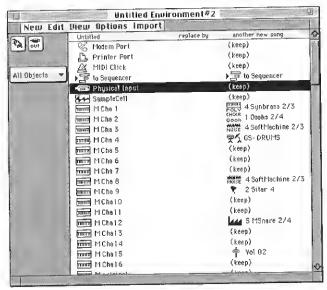
Adjustment by Assignment

If you want to combine the Environment objects from two songs according to selectable criteria into one Environment, there are two steps: first, objects from the second song are assigned specific objects from the first song — either manually or using automatic assignment functions. Once all the assignments have been made, you can carry out the actual import.

• Open the song whose Environment you want to change.

- Choose **Options > Import Environment > Custom...**. If there were no other songs in the memory a file selection box appears and you load the song whose Environment you want to enlarge.

- An Environment import window appears. This window is the same as a normal Environment window in the first layer (*All Objects*) which is switched to **View > by Text** and **View > Import Options**.

- In the left column all the objects of the current song are aligned vertically. The right column shows objects from the second song.

- From the right column, via a pull-down menu, you can now choose an object from the second song, which is to be assigned to an object of the current song in the same line.

- Alternatively, you can use one of the automatic assignment functions (covered below) on selected objects from the current song.

- If you choose **Import > Import Environment using current Assignment** the objects from the current song (left side) are replaced by the assigned objects from the second song (right side). (UNDO is available.)

LOGIC also automatically imports all objects which are cable destinations of copied objects.

Import Options

When carrying out the import function, the following options have an effect if the corresponding menu item is checked:

Import > Copy Layer Names: the layer names of the second Environment are transferred to the current one.

Import > Copy selected Objects from 2nd Environment: all selected objects from the second Environment are copied into the current one, providing they are not copied by an assignment.

Automatic Assignment Functions

The assignment functions described below are immediately applied to all selected objects in the left column. They are assigned an object from the second song (right column). Objects assigned by a function are then deselected.

Import > Assign as 'Keep': these objects are unaltered.

Import > Assign as 'Delete': these objects are deleted.

Import > Assign as Identical: these objects are assigned objects from the second song which match the type, icon, name, port and MIDI channel. Objects with the same internal identification number have priority.

LOGIC automatically gives an internal identification number (Unique ID) to newly-created objects. If the icon or name of an object is altered the identification number remains the same.

Import > Assign as Unique ID: these objects are assigned objects from the second song with the same internal ID number . This is useful if the Environment of the second song is a newer version of the first.

Import > Assign as Port/MIDI Channel: this means that objects with a similar port/MIDI channel setting are assigned: initially objects with the same port and channel are assigned. In the second stage objects set to port 0 and the same MIDI channel are assigned. Any remaining objects are assigned objects with the same channel.

Import > Assign as Name: these objects are assigned the objects with the most similar names if at least 80% of the name is the same. Every object from the second song is assigned only once.

Import > Assign as Icon/Name: like **Assign as Name** except the icon must match.

Logic

7.7 The Environment and OMS

What is OMS?

OMS, or the "Open Music System" (or "Opcode MIDI System", as it used to be), is a System extension that acts as a logical interface between application programs and the physical MIDI ports of your Macintosh.

To work in this way, OMS lets you define so-called "nodes", which represent the individual items in your MIDI setup. These nodes have a name and information about the gear they represent: where it is connected, what MIDI channel (s) it receives on ,and so on. You create the OMS nodes with the OMS setup program, and can then edit or erase them. For more information, see your OMS handbook (although there are some hints to follow in *this* manual, in the section *How do you create an OMS Setup for use with LOGIC?* on page 7 - 64).

Note

The OMS handbook sometimes refers to nodes as "instruments", but as this word has its own meaning in LOGIC, we will be referring to the virtual objects that you create in the OMS setup program as nodes — and only nodes.

When you are using OMS as a MIDI driver system, LOGIC is not aware of your MIDI interfaces, or the physical MIDI ports. All information concerning these is hidden in the OMS system, and cannot be accessed by applications like LOGIC. Instead, OMS gives you access to the above-mentioned nodes to communicate, and ensures that the flow of data is properly managed and maintained, if, for example, strings of data need to be merged.

As with **EMAGIC**'s Autolink (the connection between LOGIC and the librarian SoundSurfer or the universal editor/librarian SoundDiver), OMS also lets you run several programs at once.

When should you use OMS?

LOGIC offers very extensive support for OMS (from OMS version 1.2.3 onwards, in fact).

Nevertheless, you should only install OMS if you plan to run LOGIC alongside other OMS applications at the same time — for example Opcode's editor/librarian "Galaxy".

Please note that you do NOT need OMS to run an Opcode MIDI interface. In fact, you could run either a Studio 4 or Studio 5 in MTP emulation mode without compromising on functionality at all.

However, if you intend striping analog tape with SMPTE so that you can synchronise analog multitrackers with your MIDI setup, and you want to start striping SMPTE with an Opcode interface, then you WILL need OMS.

Please note two basic points:

1. The timing of LOGIC's own MIDI driver is superior to that of OMS
2. LOGIC Environments can be used fully under OMS, but in certain situations this can be a clumsy way to work

The reason for both these points is to do with the additional layer of hierachy that OMS puts between LOGIC and the MIDI ports.

LOGIC under OMS

To run LOGIC under OMS, select the option *Use OMS if availoble*, by selecting **Preferences > Communication**. Next time you start LOGIC, OMS will be used instead of LOGIC's own MIDI driver — provided, of course, that OMS has been installed correctly.

Assigning OMS nodes to LOGICs inputs

You connect OMS nodes to LOGIC's inputs on the **Preferences > OMS Input Connections** page. These connections are necessary if LOGIC is to receive MIDI events (from external keyboards, for example).

If the option *Connect oll Reol OMS Input Nodes with Logic* is active, all the information from the real, physical OMS nodes will be received by LOGIC. Normally, this means all the information that is received at the inputs of your MIDI interface.

If this option is switched off, LOGIC will only receive information from nodes that have been selected via the input flipmenus. If none of these have been assigned, LOGIC will be unable to receive *any* MIDI information at all!

You can select eight more OMS nodes from here to input data to LOGIC's inputs, but normally this will not be necessary if the *Connect all Reol OMS Input Nodes with Logic* option is active.

However, the selection of OMS nodes for connection to the input is important if you wish to establish a connection to run between two

simultaneously active programs via the virtual OMS nodes . This is known as IAC — inter-application communication.

It's not a problem if you connect up a node to more than one destination; superfluous connections are simply ignored.

After you've turned off the *Connect all Real OMS Input Nodes* option, you'll have to switch OMS briefly off, then back on again via **Preferences > Communication**. This breaks the previous input connections for good and establishes the new ones.

Note

Input connections to OMS slow the computer down. You can speed things up — particularly if you have a slow Macintosh — by only making the connections you are really going to need.

Tip

Assigning Instruments directly to OMS nodes

If you're using OMS, you can connect the outputs from instruments in the Environment directly to any OMS nodes you like. Between the icon and the Cha parameter, there is a row for settings which is only visible when OMS is in use. If no OMS node has been accessed directly, this row should read *No OMS node*. Clicking on this opens the OMS output menu, where you can choose any OMS node. While an OMS node has something assigned to it, direct assignments (using the *Cha* parameter) cannot be made. To indicate this, this parameter will simply show OMS. If you click on *OMS* in the *Cha*-line, you will erase the OMS assignment, and reassign a physical port again.

Please note that when OMS is being used as a MIDI driver, its access to the physical ports is only possible via the OMS Output Map.

Assigning LOGICs outputs to OMS nodes

Just in case OMS is used, LOGIC allows all the physical output settings, such as M3 (Modem, Port 3) oder P0 (Printer, Port 0 = all outputs), to be assigned to any of the OMS nodes that you have created.

This process of output assignment is carried out from the **Preferences > OMS Output Map** page. There are entries there for the modem ports 0-16, and the printer port 0-16. The assignments you set up here in this table are stored in the Preferences, and are therefore used in all songs until they are changed from here again.

Why would you want to assign the physical output settings to OMS nodes?

There's a good reason! Once you've created the assignment table, you can play back old songs, and create new ones – BOTH WITH OMS AND

WITHOUT, and without the need to edit or reconnect any more objects.

This is particularly useful if you have many old songs created without OMS — they will all work immediately, without any changes being necessary. These songs will still be usable if you switch OMS off or deinstall it; your songs do not need to be saved destructively over the non-OMS versions if you don't wish to.

How do you create an OMS Setup for use with LOGIC?

The following steps will take about half an hour, depending on how well you know OMS. When you've created the Setup, everything becomes really easy and simple. We suggest you go about it this way:

1. Start your OMS Setup Program.

2. Create a node for each of the physical outputs your system has, and name them in the same way that LOGIC does — "M1", "M2", ... and/or "P1", "P2", etc. Turn off the "Multitimbral" option as you do this, so that LOGIC doesn't try to put multi-instruments on these nodes. That would be a waste of memory, and would also lengthen the instrument selction list unneccessarily.

3. You can skip this point, but it can be useful to create OMS nodes called "M0" and "P0", which are connected to the nodes on the ports created in Step 2. These nodes mirror LOGICs ability to address MIDI events to all ports simultaneously.

4. Exit the OMS setup program. This OMS setup should now never be changed, unless it's to add another MIDI interface to your system. Of course, you can add OMS instruments at any time — but for work with LOGIC, that shouldn't be neccessary. Just create virtual representations of new synths in the Environment in the usual way.

5. Boot up LOGIC, and activate OMS (via **Preferences > Communication**) if you haven't already. OMS must be up and running as your MIDI driver.

6. Select **Preferences > OMS Output Map**.

7. Assign each OMS node to the corresponding output; for example, Modem 1 should be assigned to the 'M1' node in the flip menu.

8. Quit LOGIC, so that the LOGIC Preferences file updates itself (or select **Options > Save Preferences** from the Key Commands window).

That's it! Now you should be able to open any of your old songs, and if
you've set up everything correctly, then a song should sound identical,
whether you use OMS or not.

LOGIC as an OMS node

You'll find the *Create virtual IAC OMS Instrument for Logic* option in
Preferences > OMS Input Connections . With this function, LOGIC
creates a virtual node called LOGIC in the OMS Setup. The node will be
visible to connect cables to in OMS applications which support IAC
(inter-application communication).

Please remember that LOGIC can transmit all MIDI data (track events,
MTC, or MIDI clock, for example) to all OMS nodes, even virtual ones
representing other programs which support IAC!

Points to note when working under OMS

• MIDI Clock/SPP and MTC Output

You can make each OMS node an output for MIDI Clock/SPP (Song Posi-
tion Pointers) or MTC. Just make the necessary settings via **Song Set-
tings > MIDI Options**.

• Rectangular Output Symbols

OMS objects in the Environment now appear with rectangular output
symbols instead of the usual triangles. Together with the "OMS" output
parameter, this makes it easier to recognise OMS objects at a glance.

Initialising OMS settings
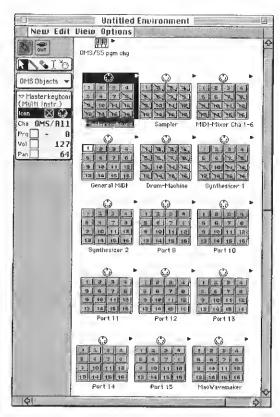
Select **Options > Initialize > just OMS settings** from the Key Com-
mands window. This initializes the OMS Output Map, all the input con-
nections and the settings for MIDI Clock, MTC and the CBX Ports.

Using existing OMS Setups

If you boot up LOGIC when OMS is already active, an Environment layer
named *OMS Objects* is automatically created. This contains all the
pieces of equipment defined in the OMS studio setup, depicted as Envi-
ronment objects.

Updating the OMS objects

If you edit your current studio setup with the OMS Setup program, and
then switch back into LOGIC (both program can be run simultaneously,

after all), then all the OMS nodes in the menus and OMS objects in the Environment will be automatically updated.

Alternatively, you could use the key command *Update OMS Objects* to achieve the same effect.

The *OMS Objects* layer might look something like the picture shown:
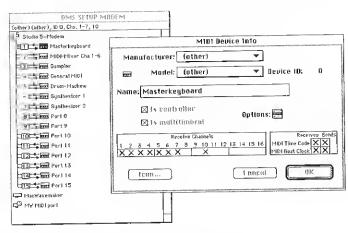
The OMS Objects Environment Layer

In the OMS Objects Environment Layer, the following settings are taken from the OMS studio setup:

*   The names of the OMS instruments,
*   The number and assignment of the ports (in the example shown in the diagram, there are 15 instruments on Opcode Studio 5 ports and one Macintosh MIDI card with OMS driver), and

EmAGiC

- The channels of the multi-mode instruments (as activated sub-channels of multi-instruments).

The OMS settings for the Environment layer shown above are as follows:

On the left is the OMS setup. The left side is where all the MIDI ports and internal MIDI cards are defined. All external MIDI devices on the right are connected to the ports by cables.

The right window (MIDI Device Info) is for making settings for the individual MIDI devices. Bear in mind that the receive channels which are active here are "translated" into the active sub-channels of the multi-instrument.

Points to note about exisiting OMS studio setups

If you are using OMS, the port objects and port settings of the instruments (with direct output assignment) are no longer relevant. Instead, you have to use the multi-instruments created in the OMS Objects layer as output objects.

This means that you have to connect all appropriate instruments, effect modules or faders at the end of the signal path to a sub-channel of the OMS multi-instrument (via a flip menu while holding down the ⌘ key). You can also spread the OMS multi-instruments over different layers.

This method is somewhat fiddly. If you really want to get the best out of using the LOGIC Environment window with OMS, take a look at the

methods described above (from the section *Assigning OMS nodes to LOGICs inputs* on page 7 - 62 onwards).
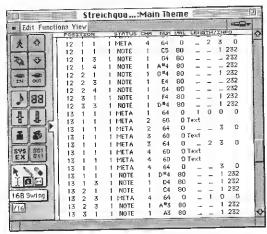
Chapter 8
The Editor Windows

The Editor windows give you immediate access to recorded MIDI events. Because of the broad range of information that can be contained within MIDI events, it is impossible to dispaly all the possible data in the best way with just one kind of editor. This chapter therefore gives a brief overview of the purpose of the individual Editor windows, followed by a description of the general functions available in all Editor windows.

8.1   Overview

8

Event List

This editor provides a display of all recorded events in list form. It also allows you to hide specific types of events.

```
                    Streichqua...:Main Theme
  Edit Functions View
            POSITION    STATUS CHA  NUM  VAL  LENGTH/INFO
         12  1  1    1 META    4   64   0    _  2  3   0
         12  1  1    1 NOTE    1   C5   80   _  _  1 232
         12  1  3    1 NOTE    1   G4   80   _  _  _ 232
         12  1  4    1 NOTE    1   A#4  80   _  _  _ 232
         12  2  1    1 NOTE    1   G#4  80   _  _  1 232
         12  2  3    1 NOTE    1   E4   80   _  _  _ 232
         12  2  4    1 NOTE    1   G4   80   _  _  _ 232
         12  3  1    1 NOTE    1   F4   80   _  _  1 232
         12  3  3    1 NOTE    1   D#4  80   _  _  1 232
         13  1  1    1 META    1   64   0    1  0  0   0
         13  1  1    1 META    2   60   0 Text
         13  1  1    1 META    2   64   0    _  3  0
         13  1  1    1 META    3   60   0 Text
         13  1  1    1 META    3   64   0    _  2  3   0
         13  1  1    1 META    4   60   0 Text
         13  1  1    1 META    4   60   0 Text
         13  1  1    1 META    4   64   0    _  3  0
         13  1  1    1 NOTE    1   D#4  80   _  _  1 232
         13  1  3    1 NOTE    1   D4   80   _  _  1 232
         13  2  1    1 NOTE    1   C4   80   _  _  1 232
         13  2  3    1 META    4   64   0    _  1  0  0
         13  2  3    1 NOTE    1   A#3  80   _  _  1 232
         13  3  1    1 NOTE    1   A3   80   _  _  1 232

  SYS  001
  EX   011

  16B Swing
  /16
```

The Event List is the only editor which gives you full access to *all* recorded information.

Hyper Editor
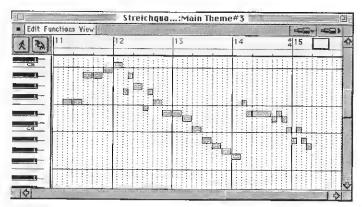
The Hyper Editor contains a number of lines in which different event types are shown as vertical beams. The vertical height of the beams corresponds to the value of the editable data bytes and the horizontal position to their position in time.

The Hyper Editor is well suited to creating and editing drum parts and editing continuous controller data.

Matrix Editor

The Matrix Editor displays notes as horizontal beams in a two-dimensional matrix. The vertical axis represents the pitch and the horizontal axis the timing or bar position.
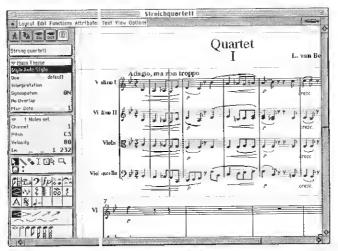
The Matrix Editor is ideal for adjusting the exact position and length of notes in a sequence.

EMAGIC

Logic

Score Editor

The Score Editor displays the notes in traditional music al notation.

The Score Editor gives you a quick overview of the musical data in a sequence (provided you can read music!). The score display also allows you to simultaneously view and edit several sequences from a folder.

A wide range of score editing and layout functions is available.

Transform Window

The transform window is used if you want to carry out edits on events of a particular type, for example those whose MIDI channel, data bytes, position or length match a certain condition. This window is also handy for carrying out complex edits involving several changes simultaneously on , or applying arithmetical changes to, certain specific parameters in the events you've selected.
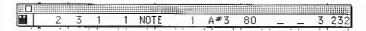
The Transform window, in essence, allows you to define your own custom functions. Certain handy applications are already defined when you start using LOGIC, for example quantisation or the function which allows you to set a limit on the minimum or maximum permitted note length. More about this from page 13 - 1 onwards.

Other Editors

There are other editors designed for specific purposes, but in terms of display and operation these are just variations on one of the above-named basic types.

Event Float Window

The small event float window may be used in combination with the Matrix, Score or Hyper Editors, since it contains *all* the information on *one* selected event.

Tempo Editors
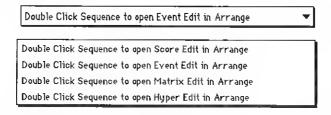
This is where tempo changes are displayed as events, either in the form of an Event List for editing individual tempo changes , or in the form of a "single line" Hyper Editor for editing gradual tempo changes (page 16 - 4).

8.2   General Functions

Opening Editors

There is an option on the page **File > Preferences > Global** which lets you choose the editor that will be opened when you double-click on a sequence.

The options are: the Score Editor, the Event Editor, the Matrix Editor, and the Hyper Editor.

Control output via MIDI

Switching on the MIDI Out button causes MIDI events to be output when they are added, selected or edited. This allows you to audibly monitor every editing stage, whether you are scrolling through the Event List (automatic selection) or transposing a note.

Automatic Scroll Functions

... scrolling to the Song position

The button with the walking man on it activates the Catch function, which means that the window view will always show the current song position.

... scrolling to the selected event

The key command *Scroll to Selection* allows you to automatically move the window so that the first of the currently-selected events is visible.

Contents Link

Clicking on the button with the chain symbol on it activates the link function, and double-clicking it activates the "show contents" function. In "show contents" mode the window always shows the contents of an object selected in the top window; in link mode the window shows the same objects as the window where you are making the selections.

For a full description of the catch and link functions see page 4 - 14.

In Editor windows, contents link is usually active. You can then, for example, select some sequences in an arrange window, and when you swap to a screenset with an open editor window, you will see the contents of the selected sequences.

Selection Commands & Editing Functions

Selecting Evnts with the same MIDI channel

If you've selected an event, you may select all the other events on the same MIDI channel by using the command **Edit > select equal channels**.

Imagine you're editing a sequence that contains volume and pan controller information for 16 MIDI channels. To select all the events on channels 1 and 3, you simply grab one event which is on channel 1 and one which is on channel 3, use the "Select Equal Channels" function, and all the othe r events onthese two channels will be selected.

Example

Splitting Chords

In the "Functions" sub-menu in the Editor windows there is a new func-tioncalled "Note Events". This allows you to manipulate selected notes in a manner influenced by the notes surrounding or overlapping them; musically speaking, you can think of this function as adding division lines within chord sequences. These functions can be very useful if you want to set up a polyphonic display within the Score window.

Selecting the Soprano voice

The command **Functions > Note Events > Select Top Line** selects the highest notes in the selected chords of a sequence. All previous se-lections are ignored.

Selecting the Bass voice

The command **Functions > Note Events > Select Bottom Line** se-lects the lowest notes in the selected chords in a sequence. All previous selections are ignored.

Select Top Line and *Select Bottom Line* are purely selection commands which can be used in conjunction with any of the editing commands, like Cut; for example, to move a voice into another sequence or to alter just the velocity of all the notes in a sequence.

Splitting voices across MIDI channels

The command **Functions > Note Events > Lines to Channels** as-signs MIDI channel numbers (in rising order) to the single notes in the selected sequence , beginning with the highest chord note as MIDI channel 1. Only selected events are affected, so you should use the **Se-lect All** command first, or a related command, such as **Select within Locators**.

The result will only change if you play the sequence back through an »All Cha« instrument.

Usage Thanks to the different MIDI channels, you can score the individual notes in polyphonic score styles, or split each note off into its own se-quence using the Arrange window function **Structure > Split/Demix > Demix by Event Channel**.

Logic

Setting Locators by Objects

The **Functions > Set Locators by Objects** command allows you to set the locators in all the Editors (just as in the Arrange window) so that they just encompass all the currently-selected events. The key command can be found in the Key Commands window under *Global Commands*.

Edit Functions

For a description of the undo and clipboard functions (particularly adding events at the Arrange level), refer to page 4 - 21.

Transform Functions

The process of calling up preset (and your own) parameter sets in the Transform window is described in the section *Calling up Presets and your own Sets* on page 13 - 10. You can get to these directly in the Editors via the local menu command **Functions > Transform ...**.

Altering Note Lengths

While changing the lengths of multiple objects you can make all lengths equally long by holding ⇧⌘.

Removing overlaps

When you choose **Functions > Note Overlap Correction** any overlapping notes are shortened enough to remove any overlaps.

The affected notes must be selected first. The function seeks out notes that overlap and shortens them to remove the overlap. If the overlapping notes show signs of chord characteristics, you will be presented with the following options:

KEEP - the simultaneously-sounding notes will be shortened together.
DELETE - the simultaneously-sounding notes will be removed, leaving a monophonic line behind.
SHORTEN - the simultaneously-sounding notes will be shortened separately, so that again only a monophonic line will remain.

Legato

With **Functions > Note Events > Note Force Legato** you can lengthen all selected notes such that each note sustains all the way up to the start of the next one, in a "legato" manner.

If LOGIC finds a chord, a dialog box will appear saying "Chord found! Delete Chord Notes? Keep / Delete". *Delete* erases any wrong notes in

a badly-played monophonic line, while pressing ⏎ or *Keep* joins up all the notes in chords which were played intentionally.

Converting Sustain Pedal Events to Note Lengths

The command **Functions > Note events > Sustain Pedals to Note Length** takes all the sustain pedal events (controller #64) on selected notes and changes everything so it still sounds the same, but now the notes actually last for the amount of time the sustain pedal was previously held down. The pedal events are erased by this function altogether.

A point of note in the Score window: in page view all selected sequences are edited. Even if the result sounds the same, the score can look different because of the notes which have been extended (and, of course, the pedal symbols will have been deleted).

Repeating or Copying Events

To repeat selected events once or several times (with adjustable rounding of the position of the first repeated event), you can use the function **Edit > Repeat Objects** described on page 6 - 12.

By choosing **Functions > Copy MIDI Events** you can move or copy all events between the locator positions to a different position (default: song position). This function also offers several other options which are described on page 6 - 54.

Deleting Events

The basic techniques are the same as for deleting sequences:

- the ⌫ (delete) key deletes all selected events,

- the eraser also deletes all selected events and any events that have been clicked upon (whether selected or not).

Deleting Similar Events

For a description of how to delete similar events (e.g. events with the same controller number) or all events except similar ones see page 4 - 20.

Deleting Doubled Events

Doubled events at the same bar position may be deleted (as in the Arrange window) by selecting **Functions > Erase MIDI Events > Duplicates**. Doubled events may have different second data bytes (velocity, aftertouch or controller values); LOGIC Audio looks only at the

Logic

event type and position when determining whether two or more events are doubled or not.

Deleting Events by Reference to the Locator Positions

Choosing **Functions > Erase MIDI Events > …** also allows you to delete all events between (… > **Inside Locators**) or outside (… > **Outside Locators**) the locator positions.

Deleting Events Outside the Sequence

When copying events or shortening sequences, events can sometimes end up outside the limits of a sequence, although technically they still belong to this sequence. You can delete these events by choosing **Functions > Erase MIDI Events > Outside Object Borders**.

Fixing Events to SMPTE Times

Refer to the section *Synchronizing to SMPTE* on page 16 - 27.

Moving Events

You can move one or more events in the editors by using the following key commands. In the Arrange window the same commands may be used to nudge entire sequences by the corresponding grid amount:

- *Nudge Event Position by SMPTE frame +1*
- *Nudge Event Position by SMPTE frame -1*
- *Nudge Event Position by SMPTE Bits +1*
- *Nudge Event Position by SMPTE Bits -1*
- *Nudge Event Position by Tick +1*
- *Nudge Event Position by Tick -1*
- *Nudge Event Position by Division +1*
- *Nudge Event Position by Division -1*
- *Nudge Event Position by Beat +1*
- *Nudge Event Position by Beat -1*
- *Nudge Event Position by Bar +1*
- *Nudge Event Position by Bar -1*

The selected events (or sequences in the Arrange window) are shifted by one step right (+1) or left (-1), measured in the units mentioned in the particular command name.

Step-time Recording

Step-time recording means that the notes you record are being entered via the keyboard, but not at any defined tempo, as in real-time recording. After each note is inserted the sequencer then "steps" ahead

8

by a distance which is determined by the division setting in the Transport window. Every note or chord you enter automatically receives this note value or a multiple of it. MIDI Step-time input is activated in the Score, Event List and Matrix Editors by pressing the MIDI In button.

Here's an example. Imagine you are in one of the editors, and have selected a sequence or created one with the pencil tool . Events, incidentally, are always inserted at the song position.

- Switch on MIDI In.

- Play and hold a note or chord. You may even hit the notes for the chord one after another if you like; the impoortant thing is that at least one note remains pressed from the beginning.

- Release the last note. This moves the song position on one step, ie. by the value entered on the transport, and you may enter a new note.

- Rests are entered with the sustain pedal. Each time you press this, you step through the song by the value entered on the transport.

- You may enter longer notes or chords by pressing the sustain pedal while holding down the note(s).

You may change the division value at any time, even whilst you are holding down notes.

Step-time input is also possible from the score display. However, the quantize value *Default* should be avoided, as the note display will then change every time the step size is altered.

Keyboard Control

When employing step-time input, there are a few special, uneditable key commands that can only be used if the keys in questions have not been redefined for another purpose (see the section *Keyboard Commands and Remote Control via MIDI* on page 4 - 23).

⊟ oder ⊟: as the sustain pedal. (please note that ⊟ is the default key for *Record Toggle*. If you wish to use ⊟ to move along in steps, you will first have to delete this key assignment; see the section *Deleting Assignments* on page 4 - 26).

N   jumps to the next bar division position; so in $\frac{4}{4}$ time, to the next quarter note.

M   jumps to the next bar.

Logic

B̄   moves back a step and erases the event there.

Ā   sets the division value to $\frac{1}{4}$.

S̄   sets the division value to $\frac{1}{8}$.

D̄   sets the division value to $\frac{1}{16}$.

Q̄   sets the division value to $\frac{1}{32}$.

W̄   sets the division value to $\frac{1}{64}$.

Ē   the current division value is set to the next highest triplet value: for example from $\frac{1}{16}$ to $\frac{1}{24}$.

R̄   the current division value is set to the next lowest triplet value: for example from $\frac{1}{16}$ to $\frac{1}{12}$.

The key commands will continue adding up the values if the MIDI keyboard key is held down.

Editing via MIDI input

By double-clicking on the MIDI In button, you switch on »Edit by MIDI In Mode«. The values of the MIDI data being input are then used to edit the **Pitch** and **Velocity** of the currently-selected note. The note length remains unchanged. In contrast to MIDI step-time input, no new data is created; what exists already is merely changed. The key commands *Select Next / Previous Event* allow you to move one note further forward or back.

8

Event Quantization

The Event Editor has a separate quantization function which can be targeted on all selected events. Unlike quantization for arrange objects the event quantization applies to all events, not just notes. It irreversibly alters their positions (and only notes can be returned to their recorded positions).

Quantizing Events

Select the events that you want to quantize.

You open the pull-down Quantization menu by grabbing the "Q" button shown here.

This is identical to the matching pull-down menu for the playback parameters, and contains its own quantization grid (for details see the

---

section *Quantization* on page 6 - 26). As soon as you choose an item from the menu, all the selected events are quantized.

Please remember that you can only reverse note quantization. All other events are permanently shifted.

To apply the same quantization grid to another series of selected events (even in other Editor windows), select **Functions > Quantize again**, or click quickly on the "Q" button again.

Note Quantization

Normally, all notes in a sequence are quantized according to the Quantization parameter in the sequence parameter box and the extended sequence parameter box (all this is explained in greater detail in the section *Quantization* on page 6 - 26).

To quantise single notes in either of the Note Editors (the Matrix or Score Editors) you can use the Q tool, as well as event quantise.

If you click on a single note (or a selected group of them) and hold down the mouse button, the well-known quantise menu should open, where you can choose the quantization you want.

If you click quickly on notes, the last quantize value will be used again, just as with the Quantize Again command.

If you click on the background with the Q tool you get the usual rubber band for selection of several objects at once.

Special note for Score window working: it depends on the chosen display quantize value whether quantization has an effect on scores.

Dequantizing Notes

Note events can be returned to the place they were played in at or positioned by hand by entering the setting *Qua off (3840)* or by clicking on the Q button whilst holding down the ⌦ key.

Alternatively you can dequantize all the currently-selected notes by clicking on them with the Q tool whilst holding down the ⌦ key.

You achieve the same result by selecting **Functions > De-Quantize**.

Display Functions

Chapter 4, *Using LOGIC*, describes the basic window functions, including how to lay out the window elements to make more space for the

event display in the graphic editors, and how to operate the zoom functions .

Many of the display options in the editor windows correspond to those in the Arrange window:

By choosing **Uiew > Parameters** you can hide or show the parameter fields to enlarge the window's working area. The keycommand is *Hide/ Show Parameters*.

In the Matrix and Hyper Editors you can conceal or reveal the transport panel in the top left corner by choosing **Uiew > Transport**.

In all editor windows apart from the Event List you can replace the bar ruler with a SMPTE time display by choosing **Uiew > SMPTE Time Ruler** (see page 16 - 31).

Changing Display Levels

Normally, the Editor windows are in the lowest display level, ie. the one that shows individual events. However, by clicking the small "box" icon in the upper left corner of the editor window, you can move up one level in the folder/sequence hierarchy (ie. if you are currently looking at the events in a sequence inside a folder, the display will switch to a view of the contents of the parent folder.)

Matrix and Hyper Editors
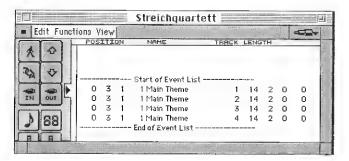
In the Matrix and Hyper Editors, this means that you will then see an Arrange window. In this case, when you change to the lowest level the relevant editor reappears. On the Arrange level, you will see the local menus of the Matrix or Score Editors, which also contain all the functions of the Arrange window. Double-clicking on a sequence opens the usual Hyper or Matrix display of the contents of the sequence. This means you can quickly switch to another sequence and edit its contents.

Event List

Clicking the small "box" icon in the Event List moves you up one level in the hierarchy, just like the other editors. In the Event List, however, the form of the display remains the same but instead of a list of the individual events you now see a list of the sequences along with their position, name, track number and length. The sequence that you have just "left" will be selected.

Here, too, double-clicking on a sequence (or using the "Go into Folder/ Sequence" key command) takes you back to the lowest display level.

Score Editor

In the Score Editor, clicking on the "close directory" symbol or double-clicking on the background takes you to the higher display level. Unlike the other editors, in the Score Editor individual events can also be edited in higher display levels. Double-clicking on a staff (at an empty point) takes you back to a lower display level.

Don't worry if all this sounds a bit confusing; in fact, the whole process of changing levels is much easier to grasp if you simply try it yourself rather than trying to understand it solely by reading this text. Read first, then experiment with the various editors in one of the Tutorial songs.

EMAGIC

Chapter 9
The Event List
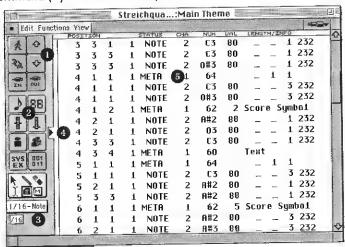
The Event List combines all the data-editing functions of all the other editors apart from graphic operations and the expressive options offered by the Score Editor.

Usage

The Event List is used whenever you need to make precise alterations to recorded data and the graphic display of the other editors is not suited to the task. It is the only editor which gives you access to all recorded event data. You can also restrict what you see and edit to specific event types.

Opening the Event List

To open the Event List and view the contents of the selected sequence, choose **Windows > Open Event List** (⌘②), or use a self-defined key command (*Open Event Editor...*).

You can also open it by double-clicking on a sequence if the *Double Click Sequence to open Event Edit in Arrange* checkbox is checked under

Preferences > Global (or by double-clicking on the sequence whilst holding down the ⌥ key if the option box is not checked).

Structure

The standard buttons are supplemented by two scroll arrows ❶ to help you move through the list. The event type buttons below them ❷ allow you to remove specific event types from the display and access or add them (by clicking on them while holding down the ⌘ key). Beneath the toolbox is the quantization grid selection field for the event quantize function (above ❸). There is also a field for defining the Division value (to the left of ❹) which corresponds to the Division value as set in the Transport window. If the Catch function is switched on, the arrow-shaped position marker ❺ will always point to the current event. The structure of the actual list display ❻ is described on page 6.

9.1   Display

The event type buttons allow you to "filter" the display to remove individual event types from the Event List, so that you can view only the specific types of events you are interested in. Click the desired button with any tool (except the pencil).

If a button is grayed out, that event type will not be displayed.

Important!   All the functions affect only the events displayed; so non-displayed events are protected from any alterations you make.

Here is a short overview. For more detailed information on the individual event types see page 9 - 10.

The note symbol stands for **note events**.

The symbol with the dual-digit, seven-segment display stands for **program change events**.

The hand wheel symbol with a marker in the middle (pitch bend wheel) stands for **pitch bend events**.

The hand wheel symbol with a marker at the bottom (modulation wheel) stands for all **control change events**.

The single weight symbol stands for **aftertouch events** (channel pressure).

The multiple weights symbol stands for **polyphonic key pressure events** (polyphonic aftertouch).

This symbol stands for **SysEx events**.

The symbol with a row of zeros and ones is called the **full message** button. This does not filter out any type of event but affects the display of all event types.
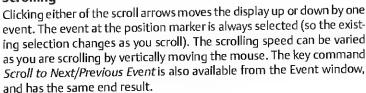
Normally the display in the Event List is restricted to one line per event. However, when the full message display is active, all information stored along with the event is shown too. This is particularly important for editing SysEx messages.

When examining note events in the Event List, you will also notice LOGIC's internal layout information included in the list. You can edit this in the Event List if you want, but it serves little purpose.

9.2   Operation

Scrolling
Clicking either of the scroll arrows moves the display up or down by one event. The event at the position marker is always selected (so the existing selection changes as you scroll). The scrolling speed can be varied as you are scrolling by vertically moving the mouse. The key command *Scroll to Next/Previous Event* is also available from the Event window, and has the same end result.

Remember that if the MIDI Out button is switched on every newly selected event will be played. This means you can scroll through the list and audibly monitor the events as you go.

If you want to keep the selected event where it is, use the usual scroll bar functions.

Selection Techniques
Generally, when selecting events with the mouse, you should click near the status column to avoid any unintentional parameter alterations.

You can use any of the standard selection techniques here: individual selection by clicking on objects, multiple selection using the rubber band, or both of these (without altering the previous selection) in conjunction with the ⇪ key. Don't forget you can also make selections ac-

cording to specific criteria via the **Edit** menu (read the section *Selection Techniques* on page 4 - 18).

Any events which you remove from the display by clicking on the event type buttons are immediately deselected. This ensures that all the functions affect only the displayed (selected) events.

Special Selection Functions

Some selection commands (which can be accessed from within all the Editor windows via their Edit menus) can also be utilised in the Event List by selecting an item with the mouse whilst holding down additional modifier keys:

1. If you click on an event whilst holding down the ⌶ key, you select all events between the last event that was selected and the current one.
2. If you hold down the *ctrl* key and select an event, all *similar* events will also be selected.
3. If you select an event whilst holding down the *ctrl* and ⌶ keys, all the events that are *identical* will be selected.

Event Editing

Adding Events

To add an event, click on the desired event type button with the pencil (or with any other tool while holding down the ⌘ key). The event is then added at the current song position and is automatically selected.

Duplicating Events

To duplicate an existing event (for example, so you can alter the parameter value of the copy) click on the original event with the pencil. An input box appears — this is where you enter the position for the newly-duplicated event. If you just hit ⏎, the duplicate will appear at the same place as the original.

Pasting from the Clipboard

When adding events using the clipboard's **Paste** function, a position input box will appear for you to type in the position of the first event. Once again, if you confirm by just pressing ⏎, the original position of the event is retained. The relative positions are also always maintained.

This means that the events are *not* added at the song position, as in the graphical editors! For more details on the way the clipboard works, please refer to page 4 - 21.

Moving Events

To move an event in time, just alter its position indicator. As soon as you alter its position, the list is automatically sorted, although the currently-selected object remains the same.

Altering Values

Event positions or parameter values can be altered in the usual way using the mouse like a slider (grabbing and dragging) or via text input (just double-click on the parameter value).

However, you cannot alter the *type* of events using this method. Instead, you either have to open a transform window, or add an event of the desired type, and delete the original event.

Altering the Values of Several Events

If a parameter of a selected event is altered, this affects the same parameter in all selected events.

Relative Value Alteration

Normally, when you alter parameter values in a multiple selection, the relative differences between the parameter values remain unchanged. The parameter values that you grab or double-click on can therefore only be altered until the value of one of the selected events has reached its maximum or minimum value.

Flexible Relative Value Alteration

If you want to continue altering a parameter value in a multiple selection, even if one of the the values in the selection has reached its maximum or minimum, hold down the ⊠key while you move the mouse, or press ⏎ to confirm a numerical input.

Absolute Value Alteration

If you want to set a parameter to the same value for all selected events hold down the ⌥ *and* ⊠ keys while you use the mouse as a slider, or press ⏎ to confirm a numerical input.

Numerical Value Input

There are a few special points that need mentioning concerning numerical editing of events in the Event List:

- You may jump to the next event parameter using the ⊒ key;

- When entering event time positions and lengths, you can jump from part to part within the value you're inputting using the ⊒ key;

- New events can be created simply by using the ASCII keyboard: when you're numerically editing events, you can duplicate them by simply hitting the ⃞esc⃞ key.

The key command "*Duplicate Event and Numerical Edit*" also allows you to create new events: if an event is selected, it will be duplicated. If no event is selected, a new one is created.

9.3   Event List Structure

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO		
1	3	1	1	NOTE	1	C#2	80	_	_	1 232
1	3	1	1	NOTE	1	C3	80	_	_	1 232
1	3	1	1	NOTE	1	C#3	80	_	_	1 232
1	3	1	1	NOTE	1	E3	80	_	_	1 232
1	3	1	1	NOTE	1	E3	80	_	_	1 232
1	3	1	1	NOTE	2	G2	80	_	_	1 232
1	3	1	1	PitchBd	1		64			

The individual columns in the list have the following meanings:

Position

The position of the events in the song; for note events this means the beginning of the note. The units represent *bars*, *beats*, *divisions* and *ticks* (see page 5 - 13).

Counting begins at 1 for each unit (first bar, first beat,first division, first tick: 1 1 1 1) and continues until it is carriedover to the next largest unit.

Hint   Numerical inputs start from the left (which means you can enter just the bar number if you want). The units can be separated by either spaces, dots or commas.

Position within the Sequence

If you choose **View > Local Position**, the event positions do not refer
to the absolute location within the song but to the relative position
within the sequence.

Position and Length in SMPTE Units

If you choose **View > Position & Length in SMPTE units** the position
and length columns switch to SMPTE units.

Status

This is where you can see the event type, as specified by the status byte
of a MIDI message (for details, refer to the section *Event Type Structure*
on page 9 - 10). You cannot directly edit this parameter.

Cha

The MIDI channel used to record an event.

Remember that during playback this MIDI channel can be replaced by
the *Cha* parameter of the playback instrument. The event is only out-
put with the recorded MIDI channel when the *Cha* parameter is set to
All.

You should also keep in mind that with notation, the record MIDI chan-
nel is used to assign a polyphonic voice to the note. (for more on this,
read Chapter 12).

9

Num, Val

These columns contain event data bytes. Their meaning depends on the event type:

Status	Num	Val
Note	Pitch	Velocity
Control	Controller number	Value
Pitch	LSB	MSB
C-Press	(not used)	Value
P-Press	Pitch	Value
Program	Bank Select	Program number

Length/Info

With controller events, this column shows the controller name, and with SysEx events, the manufacturer's name.

With pitch bend events, a 14-bitvalue is displayed here, which is composed of the first (Num) and second (Val) Data bytes combined. This value can be edited directly from here.

With notes or sequences, the length is displayed here.

Here too, the units are bars, beats, divisions and ticks. For the sake of clarity when the length begins with one or more zeros, the "_" symbol is used instead. The minimum length is 1tick (_ _ _ 1) not 0 ticks, because it makes no sense to simultaneously switch a note on and off.

Numerical input starts on the right, working to the left — and you can enter just ticks if you want. The units can be separated by either spaces, dots or commas.

End instead of Length
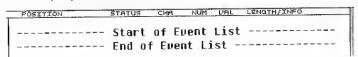
If you choose **View > Length as absolute Position** you can make the length display show the position of the note off event instead.

List Structure on the Arrange Level

When you click on this symbol or double-click on any entry or the white area above or below the list entries (if visible), you move up one level in the folder/sequence hierarchy.

```
 POSITION          STATUS   CHA   NUM  VAL   LENGTH/INFO
------------- Start of Event List -------------
------------- End of Event List -------------
```

This allows you to see all the arrange objects (sequences or folders) in the current song (or folder). On the arrange level, the list has the following columns:

```
 POSITION          NAME              TRACK   LENGTH
------------- Start of Event List -------------
   3   1   1 Main Theme        1  14   2
   3   1   1 Main Theme        2  14   2
   3   1   1 Main Theme        3  14   2
   3   1   1 Main Theme        4  14   2
------------- End of Event List -------------
```

Position

The start of the arrange object (see page 9 - 6).

Name

Name of the sequence or folder. Double-clicking on the object name switches you to the display of its contents (ie. with a sequence, you return to event-level editing.

You can alter the name with the text tool.

Track

Displays the track number. You cannot edit this value from here: you might totally destroy your arrangement if you could. If you want to move arrange objects to other tracks, it is better to do it graphically from the Arrange window.

Length

The length of the arrange object (see page 9 - 8).

9

9.4   Event Type Structure

Note Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO		
1	1	1	1	NOTE	1	A2	88	_	1	1 232

Num

MIDI note number (note #). The range is from C-2 (note #: 0) to G8 (note #: 127). Middle C has note # 60 and in MIDI terminology is called C3.

On some keyboards/synth modules (notably those made by Korg and Roland), the note range is C-1 (#0) to G9 (#127). In these cases middle C is called C4.

In the **Preferences (Display** page) you can reference the display to the description used most frequently on your devices (*Display middle C as…*).

Val

Velocity of a note from 1-127. The value 0 carries the *note off* message and thus is not available.

Length/Info

Length of the note. Although MIDI can only transfer *note on* or *note off* messages, LOGIC actually stores the position and length of all the notes which makes them easier to access musically. The *note off* message is generated automatically during playback.

Mapped Instrument Notes

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO		
- - - - - - - - - - - - -				Start of Event List	- - - - - - - - - - - -					
1	1	1	1	♪KICK 1			127	_ _ _	15	
1	1	1	1	♪CRASH 1			116	_ _ _	15	
1	1	1	1	♪CHINA			127	_ _ _	1	
1	1	3	1	♪CHH			122	_ _ _	15	
1	1	4	81	♪CHH			68	_ _ _	15	
1	2	1	1	♪SD 2			127	_ _ _	15	

If the edited sequence is played via a mapped instrument the defined names of the individual notes appear in the *Status* line. For the sake of clarity, there is a small note symbol to the left of each name.

Program Change Events

```
  POSITION        STATUS   CHA   NUM   VAL   LENGTH/INFO
   2   1   1     1  Program   1  □          1  Bright Ac Pno
```

Program change events can be transmitted to connected MIDI devices to call up different patches. These may be sounds in a synthesizer, programs in an effect unit, or snapshots in an automated mixing desk.

Val

A program number between 0 and 127.

Some manufacturers (eg. Yamaha) number the programs in their devices from 1 to 128, not 0 to 127. In this case, you have to subtract 1 from the program number given in the device itself.

Other manufacturers use various methods of dividing into groups (or banks) and sounds. The most common is dividing into 8 groups of 8 sounds, each numbered 1 to 8. These devices respond to program numbers 0 - 63 by calling up storage locations 11-88. The instruction manuals for these devices should contain conversion tables to assist you.

Num

Bank select. Normally you will see this symbol, which transmits just a program change event. If you set a number between 0 and 62, a bank select event is transferred before the program change event. This allows you to address different sound banks (e.g. preset, internal, card) inside your synthesizer. The synthesizer must be able to recognize controller 32 as bank select, but unfortunately this standard is not yet widely adopted. If you have any problems with bank select, check your synthesizer's manual to see whether and how it responds to bank select commands.

Variable Program Change

```
  POSITION        STATUS   CHA   NUM   VAL   LENGTH/INFO
   2   1   1     1  Program   1  ⊠ of Instrument
```

If there is a cross in the checkbox of the *Num* column it will be followed by the words of *Instrument*. In this case, the program number set in the instrument parameter box will be used.

Pitch Bend Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
1	1	1	1	PitchBd	1		64	

Pitch bend events are used to continuously vary the pitch. They are usually generated by a center-detented pitchbend wheel or a joystick on your keyboard.

Num

Fine pitch bend division (LSB). Many keyboards just transmit the value 0. If the pitch bend wheel has an 8-bit resolution you will see the value 0 or 64 here.
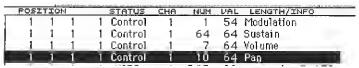
Val

The effective pitch value (MSB) of 0-127. The value 64 corresponds to the mid-way setting of the wheel.

Length/Info

The 14-bit value is displayed in this column as a decimal figure ranging from -8192 to 8191. This value may be edited from this column in the usual way.

Control Change Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
1	1	1	1	Control	1	1	54	Modulation
1	1	1	1	Control	1	64	64	Sustain
1	1	1	1	Control	1	7	64	Volume
1	1	1	1	Control	1	10	64	Pan

These event types are used to transfer all MIDI controllers, e.g. modulation, sustain, main volume and pan.

Num

The number of the controller. All the various MIDI controllers (such as the modulation wheel or sustain pedal) have their own numbers (#1 or #64). Some of the effects of a controller number on the sound generator are also defined, such as main volume (#7) or pan (#10).

With controllers defined by the MIDI Standard, a description is given in the *Length/Info* field.

Val

Value of the controller. With mechanical operating elements: the current setting. Continuous controllers have a range of 0-127. Switch con-

trollers (#64 - #90) transfer only two states; *off* (val=0) and *on* (val anything between 1 and 127).

Aftertouch Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
1	1	1	1	C-Press	1		64	

Aftertouch (or channel pressure) events are generated by a mechanical pressure sensor beneath the keyboard. The resulting sound modulation affects all the notes on a MIDI channel.

Num
This column is empty with aftertouch events, since they have only one data byte.

Val
Strength of the pressure on the keyboard (0-127).

Poly Pressure Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
1	1	1	1	P-Press	1	E3	64	

Poly pressure events are generated by mechanical pressure sensors beneath each individual key. The resulting sound modulation affects only that particular note.

Only a few keyboards currently support this capability.

Num
MIDI note.

Val
Strength of the pressure on the key.

SysEx Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
------------				Start of Event List		------------		
1	1	1	1	SysEx		4		Moog
	3	1	2	2	7			< EOX >

For more on how to program a SysEx message by hand, check out the section *Sysex Fader* on page 7 - 52, which explains how to program SysEx faders (the most important point to bear in mind is that the ar-

rows in front of and behind the word EOX are used to add or remove bytes).

SysEx Data in Hex Format

You can change the way SysEx data is displayed in the Event List or the SysEx fader editors (whether it is shown in hexadecimal or decimal) using the **View > SysEx in Hex Format** command.

Hexadecimal digits are prefixed by a $ symbol in LOGIC.

Here are a couple of tips for the real power users among you:

Numerical input (by double-clicking) is always independent of the current display mode or event type and can be used in many other areas of the program. Here are some of the possible methods. You can:

1. Use decimals like 1, 01, 2, 3, 4,127, ...

2. Use hexadecimals, like $1, $01, $2, $3, $A, $0A, $7F

3. Use notes like "C3", "C#3", "Cb3", "C##2" (equivalent to D2), "Dbb2" (equivalent to C2)

Beipiel   If you double-click on the note "E3" , you can enter a decimal value such as "64" or a hex value of "$40" instead of the note itself.

In many parts of LOGIC, mathematical operations can also be used to change values, for example:

1. By adding two existing values (eg. "+5", "+$10" etc.)

2. By subtracting from the existing value (eg. "-5" etc.)

3. By summing two values (eg. "38+17"etc.)

4. By subtracting two values (eg. "38-17" etc.)

5. By multiplying two values (eg. "7*8" etc.)

6. By dividing two values (eg. "80/5" etc.)

Meta Events

POSITION				STATUS	CHA	NUM	VAL	LENGTH/INFO
1	1	1	1	META		1	49	Screenset

Meta events are not MIDI events, but are control messages specific to LOGIC. They are used to automate specific LOGIC functions and organize objects in the notation which cannot be represented by MIDI events.

To create a meta event, hold down the ⌘ key and click on the Full Message button .

Num and Val

Num determines the function of the Meta Events you create, and *Val* is the value that is sent. In the Event List window, you should only ever insert and edit the following *Num* values:

Num = 47   Send Byte to MIDI. This sends the track instrument any byte value (*Val*) between 0 and 255 ($00-$FF). As an example of how to use this Meta Event, if you send 246 as the byte, this is equivalent to a MIDI tuning request message. The display will show "Send Byte $F6". Only use this Meta Event if you know what you're doing — if you don't, your sound modules and synths may start to behave very oddly indeed...

Num = 48   Switch Fader. This will aim MIDI events at a particular output number (*Val*) on a cable switcher. You have to first connect a cable between a track instrument (eg. »M-Playback«) and the cable switcher in question.

Num = 49   Go Screenset. This event calls up a screenset (*Val* determines the number). The track instrument is irrelavant here.

Num = 50   Song Select. This event will switch songs on a MIDI data filer (*Val* = the stored song number), if you have one connected. The track for this event is again irrelavant.

Num = 51   Goto Marker. When this event is sent, playback will jump to another marker (*Val* determines the jump-in-marker number). Once again, it doesn't matter which track this event appears on.

Meta Events can also be generated by Fader objects in the Environment window. There's more about this in the chapter on the Environment later in this manual; check out the section *Special Faders* on page 7 - 50.
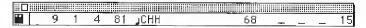
9.5   Event Float Window

The event float window can be accessed from most other windows.

Select **Options > Event Float...** (or the key command *Open Event Float*) to open an event float window. This gives information on the cur-

rently-selected object and can be likened to a single line of the Event
List. You can edit all the parameters in this window.

■	9	1	4	81	♩CHH	68	_ _ _	15

The following parameters are displayed:

- the start point of the selected object in bars, beats, divisions and
  ticks;

- the type or name of the selected object;

- (if the selected object is an event) the recorded MIDI channel, first
  data byte — for notes, the name — and, if there is one, the second
  data byte;

- length of the selected object in bars, beats, divisions and ticks.

Clicking on the film symbol on the extreme left toggles the position
and length display between SMPTE time and the normal display.

Holding down the ⌘ key whilst clicking on the SMPTE symbol turns the
»MIDI Out« button on or off, and with it the monitor that gives MIDI
playback in the Event float window).

Chapter 10
The Hyper Editor
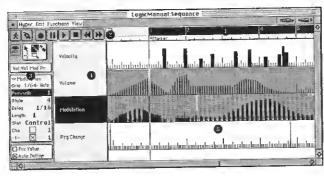
Usage

The Hyper Editor has many uses. The main ones are creating and editing drum sequences and graphically editing controller data.

Opening the Hyper Editor

To open a Hyper Editor window, select **Windows** > **Open Hyper Edit** (⌘.⑤⁹ or a self-defined key command). You will then be able to see the contents of the sequence selected in the Arrange window.

10

Structure

The structure of the Hyper Editor window resembles that of the Arrange window: there is the horizontal bar ruler at the top (❶) and the optional transport panel (❷) in the top left corner. On the left is the optional parameter area (❸), next to it the event name column (❹) and to the right of that the editing area (❺) which can be likened to the area containing the tracks in the Arrange window.

The individual lines in the Hyper Editor are functionally similar to the tracks in the Arrange window, in that each line has an event definition which determines the event type displayed in this line. When you select a line in the name column, its event definition is shown in the parameter box.

The display of the events takes the form of a horizontal row of vertical beams whose height indicates the variable value of the relevant event.

You can directly alter the value by grabbing the beam slider. It is possible to store a combination of simultaneously displayed event definitions as a hyper set.

10.1   Hyper Sets

A hyper set is a way of saving a combination of event definitions. When a hyper set is saved the vertical zoom of the Hyper Editor is stored (this determines the number of event definitions displayed simultaneously). You can save as many hyper sets as you need in a song.

Choosing a Hyper Set

Directly above the event definition parameter field is the hyper set selection field. Grabbing it opens a pull-down menu which allows you to switch to a different hyper set.

```
Vel Vol Mod Pr
  Basic Kit
 Velocity Only
 Volume Only
 GS Drums
 Volume.....
 GS-Brush
```

Creating a Hyper Set

To create a new hyper set, select **Hyper > Create Hyper Set**. The preset event definition in the new hyper set is the volume controller (#7). Any alterations that you make, such as adding or redefining event definitions, or adjusting the vertical zoom setting, are automatically stored in the current hyper set (as with screen sets).

Naming the Hyper Set

To name the current hyper set, double-click on the hyper set selection field.

Deleting a Hyper Set

To delete the current hyper set choose **Hyper > Clear Hyper Set**.

10.2   Event Definitions

The event definition of a hyper edit line determines which events it displays. This selection usually affects the status byte and the first data byte of the event. The second data byte then contains the adjustable

value, which is represented by the height of the beam. For example, in an event definition line, the value of a controller or the velocity value of a note is shown as a beam. Don't worry if this seems a bit confusing at first: when setting up the hyper definition parameters, LOGIC helps you by providing pull-down menus containing a written definition of the status byte and (to the furthest extent possible) the first data byte. There is an even simpler way to set up hyper definitions: you can automatically create event definitions for selected events — see below.

There are many ways of altering the way the beams are displayed and adjusting them to the particular event types. You can also use a grid to align the display of existing events and add new events. This grid can be set separately for each event definition in a hyper set. The height of the lines in the hyper set is adjusted using the Hyper Edit window's vertical zoom function.

Selecting the Event Definition

As with tracks in the Arrange window, you can select an event definition by clicking on the name column. This allows you to view its parameters in the event definition parameter box. Unlike with arrange tracks, however, it is possible to make a multiple selection.

Creating an Event Definition

When you choose **Hyper > Create Event Definition** a new event definition is added at the position of the currently selected event definition. Initially, it has the same parameters. The event definitions beneath it are moved downwards.

Automatically Creating Event Definitions

If you select an event in another opened editor window you can automatically create an equivalent event definition by checking the *Auto Define* checkbox.

If the current hyper set already contains an event definition which corresponds to the type of the selected event, LOGIC does not create a superfluous double definition. Instead this event definition (if required) is moved to the visible area.

Don't forget to switch off *Auto Define* immediately after completing the input!

Caution

Creating Several Event Definitions Automatically

You can also automatically create several event definitions. Just select the events on which you want to base the event definitions. You can use the same function to create event definitions for all the event types in the selected sequence.

It is a good idea to create a new hyper set first.

If you choose **Hyper > Multi Create Event Definition**... a dialog box appears asking you whether you want to create event definitions for all event types (select *All* or hit ⏎) or just for the selected events (*Selected*). Press *Cancel* to abort.

Deleting an Event Definition

Choose **Hyper > Delete Event Definition** to remove the selected event definition.

Copying Event Definitions between Hyper Sets

Select the event definition that you want to copy and choose **Hyper > Copy Event Definition**. Switch to the destination Hyper Set and choose **Hyper > Paste Event Definition**.

Converting Event Definitions

You can redefine an event definition with all its events. The values of the events are retained but the event type is changed to the new event definition. Choose **Hyper > Convert Event Definition**..., or double-click on the name column of the event definition which you want to convert.

The box shown in the diagram appears. On the left (convert) you can see the parameters of the selected event definition, and on the right you can define the parameters of the destination event type. The current settings are used as default values.

If you place a cross in the *Quantize Events* checkbox the event positions are quantized according to the *Grid* setting in the right-hand parameter field. If you make no more alterations, this allows you to quantize just the positions of the events. If there is any *Delay* value on the right side this is taken into account by the quantization.

Sorting Event Definitions

To change the vertical order of the various event definitions, just grab the event definition you want to move by its name column and drag it to the desired position.

Event Definition Parameter Box

The event definition parameter box is where you make the settings for the currently selected event definition line. The most important parameters are *Status* and *-1-* (page 10 - 7).

Opening the event definition parameter box.

You can show (or hide) the entire left parameter area by checking (or unchecking) **View > Parameters**. You can close or open the parameter box by clicking the triangle in the top left corner.

Name of the Event Definition

By clicking the name next to the triangle you can determine what appears in the name column. If you define a named MIDI controller or a note from a mapped instrument via the *Status* and *-1-* parameters the relevant name will be offered as a preset. Altering a note name in the event definition also alters the note name in the mapped instrument.

Display and Editing Grid

The *Grid* parameter is set via the familiar pull-down quantization menu. New events can then be added at the set grid positions. The positions of the existing events are not affected.

If you want to quantize the positions you can do so using event quantization (see page 8 - 11) or more simply with the event definition conversion (page 10 - 4).

The same quantization templates are available as for the playback parameters, including the ones you define yourself.

When editing complex drum rhythms, it can be useful to create several hyper definitions for one drum note, each with a different quantization grid. For example, if there are two lines for a snare drum, one with a 1/16 and the other with a 1/96 grid, you can use the pencil to add individual hits in the coarser grid and rolls in the finer grid.

Tip

Beam Width
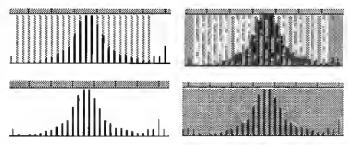
You can set the width of the event beams from *1-16* using the *Pen–width* parameter. Regardless of the beam width, the exact event position is always marked by the left edge of the beam.

When set to the maximum value *(Penwidth = 16)* note events are displayed with their actual length.

Beam Display

The *Style* parameter allows you to choose from four different color display variations for the beams. Styles 5 to 8 are the same as 1 to 4, but the selected events flash to highlight them.

Delay

The *Delay* parameter can be used to delay (with positive values) or advance (negative values) all the events in an event definition line by an adjustable number of ticks. The change in position is visible immediately. Even new events are offset from the grid positions by the *Delay* value. If you click between the word *Delay* and the parameter value you can use a pull-down menu to enter note values directly.

Unlike the sequence playback parameters' *Delay* option, this affects only individual event types or note numbers, which is very useful for drum programming.

In general, it is useful to transmit controller data slightly before or after the exact grid positions to improve the timing of the notes lying on the grid positions.

Length of Notes to be Added

You can use the *Length* parameter to set the length of notes to be added, measured in divisions (the left number) and ticks (the right number).

To guarantee optimum timing when drum programming, you should ensure that note off events are never transmitted at the same time as note on events. Use note lengths which are not close to straight note values, e.g. 100 ticks (1/48 note = 80 ticks, 1/32 note = 120 ticks). Very small tick values are also unsuitable, because the note off events may sometimes be transmitted at the same time as note on events at the same position.

Event Status

If you grab the right side of the *Status* line a pull-down menu opens where you can determine the event status for this event definition line.

MIDI Channel

Next to *Cha* there is a checkbox and to the right of this you can set a MIDI channel number. If you check this box, the display is restricted to events on the set channel. If the box is unchecked, the channel parameter is ignored.

First Data Byte

In the bottom line is the *-1-* parameter where you can determine the first data byte of the displayed event.

For example, if *Note* is set as the event status you can determine here which pitch (note #) should be displayed in this event definition line. If the edited sequence is played by a mapped instrument, a pull-down menu appears here with the names of the input notes (drum sound names).

As with the MIDI channel, the checkbox determines whether (if crossed) only events with the defined first data byte should be displayed or whether (if unchecked) the setting should be ignored. In the case of note events the velocity values of all notes (regardless of pitch) would be displayed in the relevant event definition line.

If *Control* is set as the event status you can use a pull-down menu to determine the controller type (controller #).

With channel aftertouch (status *C-Press*) or program change events (status *Program*) the setting of the *-1-* parameter is always ignored, since the first data byte is displayed as a beam height. With pitch bend data (status *PitchBd*) the setting is also ignored, because both data bytes are used to display the beam height.

10

Making Different Event Definitions Simultaneously

Like the parameters in several sequences you can set the parameters of several event definitions simultaneously. Select several event definitions in the name column by holding down ⌥ and clicking on them. You can also use **Hyper > Select All Event Definitions** to select all event definitions and then deselect some of them by holding down the ⌥ key and clicking on them.

Any alterations which you make in the event definition parameter box affect all selected event definitions absolutely.

Hi-Hat Mode

In hi-hat mode event definitions can be gathered together in groups within which a maximum of one event can be played at any time position. A typical use is gathering together different hi-hat notes (open, closed, pedal...) into a group.

To define a hi-hat group, click in any of the lines at the left edge of the name column. Click here once again to switch hi-hat mode off for that line. All lines in a hi-hat group must be vertically adjacent to each other.

If you add an event within a hi-hat group all existing events at this time position are deleted.

You can create as many hi-hat groups as you want in a hyper set, but they must all be separated by at least one line in which hi-hat mode is switched off.

10.3   Operation

The grid defined by the *Grid* parameter in the event definition parameter box is very important:

- During selection all events within a grid section are selected,

- When you change the values of existing events, all events within a grid section are altered, and

- New events are added at the grid positions, in accordance with the value set as the *Delay* parameter

Selection Techniques

You can use any of the usual selection techniques, as described in the section *Selection Techniques* on page 4 - 18. However, there are the following differences:

- To select individual events hold down the � key, as you do when selecting several events that are scattered across the screen, and;

- When making a rubber band selection hold down the ⌂ key (be careful not to click any events).

Moving and Copying Events
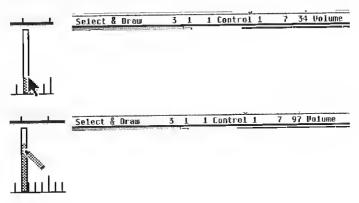
When moving selected events you also have to hold down the ⌂ key.

To copy events, use the ⌨ key as usual.

With both operations, you can move events to other event definition lines. The events will be automatically converted.

Altering Event Values
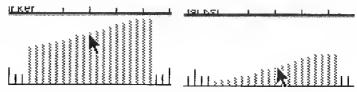
You can alter individual values by grabbing the event beam (with the mouse pointer or pencil). As you change the event value, the current value is shown in the top line.

10

Altering Several Events
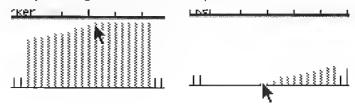
If several events are selected, you can alter all the values relatively by grabbing just one of these event beams. The absolute differences between the event values remain the same. If one of the beams reaches

the top or bottom, you will not be able to go any further in that direction.
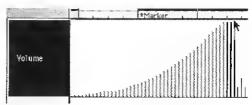
However, if you hold down the 🔲 key as well, you can keep raising or lowering the values of the selected event group until the event beam which you have grabbed reaches the top or bottom.

Editing a Series of Values

To change the shape of a succession of existing events or create a succession of new events you can either draw the beams manually or align them along a line, or even along consecutive lines.

Setting up a manual series

Existing Events

Draw the events with the mouse pointer while holding down the mouse button.

Creating New Events

Draw the events with the pencil while holding down the mouse button.

Setting up a linear series

- Select the crosshair tool.

- Click anywhere in the beam display area and hold down the mouse button.

- Keep an eye on the display showing the exact position and event value in the top line. Move the mouse to the start point of the line you want.

- Release the mouse button.

- Move the mouse to the desired end point of the line (to the right or left!). You can also keep an eye on the position and event value in the top line.

- Click to align the event beams along the line.

If there were already events in the relevant region they are aligned along the line.

If there were no events in the region new events are created at the grid positions (in accordance with the *Grid* parameter).

If you definitely want to create new events, hold down the ⌦ key when you click for the last time.

This creates one event at every grid value. With very flat shapes or very fine grids the individual grid positions always remain unoccupied if the value to be added there is the same as the value of the previous event. This reduces the data-flow along the MIDI bus without reducing the resolution of the controller.

When defining the *Grid* parameter to add successions of controllers use the motto, "as coarse as possible and as fine as necessary" to keep down the data output. LOGIC can deal with very large amounts of data but unfortunately the same cannot be said of MIDI!

Linear Series in Sections

The last time you click (regardless of whether or not you hold down the ⌥key to add new events) if you also hold down the ⌥ key you can immediately draw another line from the end point of this line.
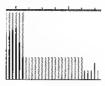
Adding Individual Events

Use the pencil to add individual events. You can alter the added value even before you release the mouse button.

Fix Value

☑ Fix Value
☐ Auto Define

If you place a check in the *Fix Value* checkbox you can prevent the height of any event beam being altered with the mouse pointer or pencil.

When adding events with the pencil all the added events are given the value of the previously-selected event. This allows you to draw a succession of events with the same value.

By selecting an event with the pencil, you can adopt this value as a preset, because in fix value mode it is impossible to alter the value by clicking on it.

When adding events with the crosshair tool, the preset value is always used as the start point of the line.
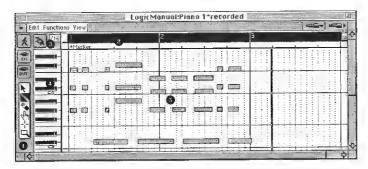
Chapter 11
The Matrix Editor

Usage

The Matrix Editor is used to graphically edit note events. Its advantage over the classical notation of the Score Editor is its ability to provide a more precise display of the length, position and velocity of the notes. The Matrix Editor is designed for optimizing the MIDI output of the notes.

Opening the Matrix Editor

To open a Matrix Editor window showing the contents of the selected sequence, select **Windows > Open Matrix Edit** (⌘64) or a self-defined key command (*Open Matrix Editor*).

Structure

The optional parameter field ❶ contains the standard buttons and the toolbox. Like the Arrange window (and the Hyper and Score Editors) there is a bar ruler at the top edge ❷. To the left of this (just as with the Transport window) you can define the sub-division ❸. The vertical screen keyboard ❹ indicates the pitch of the notes which are displayed as beams ❺.

11.1   Display

Only notes are shown in the Matrix Editor. The beams (and the way they can be edited) are very similar to the sequences in the Arrange window.

Pitch/Note Names

The pitch is indicated by the vertical screen keyboard on the left side. To help you with positioning there are horizontal lines running across the screen between notes B and C and notes E and F.

Remember that you can adapt the octave numbering to Roland/Korg devices (page 14 - 28).

If a mapped instrument sequence is being displayed, the *names* of the notes being played will appear on the vertical keyboard instead of the notes "C" and "F".

Note too that when a note is being moved, its name can be seen in the Info line.

Position

You can read the position of a note in the bar ruler. The background is marked by vertical lines to assist with positioning:

- A straight line at every bar,

- A dashed line at every beat, and

- A dotted line at every division (you can alter the division value in the Transport window or up on the left in the parameter area).

Velocity

The velocity of a note is portrayed by a horizontal white line in the note. The length of the line in relation to the total length of the note corresponds to the velocity value of the note (in relation to the maximum value of 127).

In addition, the Matrix Editor now shows the velocity of notes by using different colors.

Here are the levels:

violet	0-15
dark blue	16-31
aquamarine	32-47
light green	48-63
green	64-79
yellow	80-95
gold	96-111
red	112-127

This makes it very easy to see at a glance what spread of velocities are contained in a sequence.

If you change the velocity of MIDI notes with the V tool, you will notice that the colour of the notes change as you do it.

It may seem obvious, but... please note that this function only works with a color monitor.   Note

Background

By choosing **View** > **Change Background** you can switch to a hugely-snazzy, custom Emagic background. Zowee. However, with this type of display there are no vertical dotted lines marking the division positions. Still, this is but a small price to pay for such an eminently fashionable option.

Other Display Options

All other display options are covered in the section *Display Functions* on page 8 - 12. In the Matrix Editor, you will often want to move the visible section (using the scroll bars) and alter the display zoom (with the telescope buttons and magnifying glass).

11

11.2   Editing Notes

You can use the same intuitive editing functions as for the sequences in the Arrange window.

There are also some editing options which are available in all editor windows. These are covered in the section *Edit Functions* on page 8 - 7.

Creating Notes
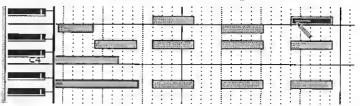
To create a note, click with the pencil at the desired point in the background.

Duplicating Notes
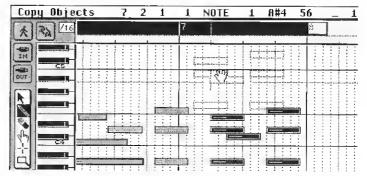
To copy an existing note to another position or pitch, first click the original note with the pencil (near the middle).

Now, any notes which you create by clicking the background will have exactly the same length and velocity as the original note.

Moving Notes

You can move selected notes by grabbing them (near the middle) and dragging them. If you move notes vertically they will be transposed and if you move them horizontally they will be moved in time. While you keep the mouse button held down the target position and pitch are shown in the info line at the top.

When you move notes horizontally, they snap onto the division positions (you can alter the division setting whenever you want).

Remember that you can limit movement to one direction to avoid accidentally transposing notes when moving them vertically (and vice

versa). (**File** > **Preferences** > **Global**: *Limit Dragging* to *one direction in Matrix* and *Score*).

Fine Movements
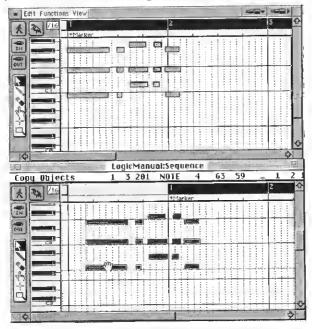
When moving notes in the Matrix window you can make fine adjustments at a high resolution by holding down the ⌷ctrl⌷ key as you drag. The exact resolution you use depends on the current Zoom setting of the window.

If you hold down the ⌷ctrl⌷+⌷⇧⌷ keys, you can move the notes in tick steps, completely independently of the Zoom setting and the time grid.

Copying Notes

Hold down the ⌷⌥⌷ key as you move the notes.
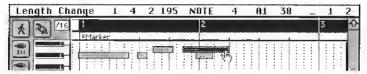
This allows you to copy or move notes between two Matrix Editor windows, even if the windows belong to different songs.

Of course you can also copy (**Edit** > **Copy** or ⌘C) or move (**Edit** > **Cut** or ⌘X) the notes onto the clipboard, and then add them at the current song position with the original pitch (choose **Edit** > **Paste** or ⌘V).
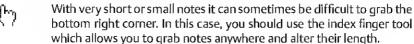
Altering Lengths

To alter the length of a note, grab it by its bottom right-hand corner and drag it to the required length. While you are altering the length, the info line will keep you informed of the precise length of the note.
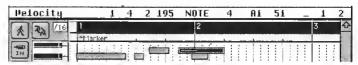
You can alter several selected notes (eg. a chord) simultaneously.

When altering note lengths, you can use either the mouse pointer or the pencil. However, it is better to use the pointer because you might accidentally draw new notes with the pencil.

With very short or small notes it can sometimes be difficult to grab the bottom right corner. In this case, you should use the index finger tool which allows you to grab notes anywhere and alter their length.

Altering the Velocity

To alter the velocity value, click on the note with the V tool. The info line will then indicate the velocity value of the note you have clicked on.

If you hold down the mouse button, you can alter the velocity by vertically moving the mouse. If the MIDI Out function is switched on, the note will be output every time you alter the velocity.

Altering the Velocity of Several Notes

All selected notes can be altered simultaneously; the differences in the velocity values will be retained. If the velocity value of one of the selected notes reaches an extreme value (0 or 127) you can't go any further. However, by simultaneously pressing the 🔳 key you can carry on altering the velocity values until the clicked note reaches an extreme value.

To give all the notes the same velocity value, hold down the 🔳+🔲 keys as you alter the value.

Deleting

You can delete selected notes by pressing the ⌫ key or clicking on them with the eraser.

11.3   Selection Techniques

In addition to the usual selection options you can select all notes of the same pitch throughout the whole sequence by clicking one of the keys on the screen keyboard.

If you hold down the mouse button you can also draw a pitch range over the screen keyboard and select all the notes within it.

Don't forget the specialized selection options available via the **Edit** menu (or key commands). These are covered on page 4 - 18.

11.4   Functions

For a description of all the other functions of the Matrix Editor, such as automatic length correction and selective deleting and copying, please refer to the section *General Functions* on page 8 - 4.

11

Chapter 12
The Score Edit Window

Using the Score Window

The Score window in LOGIC is designed with several purposes in mind.
You will use it to:

- View and edit your music in standard musical notation

- Work with notation for individual tracks, full scores or any combination of staves

- Editing pitch and rhythm.

- Editing note length, MIDI channel and velocity.

- Inserting notes into the list.

- Copying or deleting a note or group of notes.

- Setting clef, size, basic display parameters

- Add musical graphics like dynamics, slurs and articulations

- Add text, lyrics and chord symbols

- Format lines and pages

- Print

12

The Basic Problem of Computer Based Notation

Notation has always been only an approximation of musical performance. No one holds notes for the exoct length that they're shown in notation, and the point in musical time where a note begins isn't *exactly* on the beat, even when the notation shows it to be that way. In other words, human performance is always an *interpretation* of notation, not an exact representation of it.

In order for a computer software to produce scores from a human performance (MIDI data recorded in sequencing), a sort of *reverse interpretation* is required. If computer software produced the *exact* score of a performance, it would be unreadable. You'd rather see a quarter note beginning on beat two than a note beginning on the last 96th of beat one, tied to an 8th, tied to a 16th, tied to a dotted 32nd note. 8ut when

you perform it, you might play the note just a touch early, and not quite hold it for a full beat. That's called *feel*. You don't want your notation to have feel, however; it needs to be readable.

The Concept behind LOGIC's Notation Facilities

The Sequencer (MIDI data) and Score share the same data.

The notation that you see is a graphic display of the MIDI data of your sequence. The notation is NOT graphic data in and of itself. Even additions to the score that are purely graphic (and can be edited graphically) will produce alpha-numeric entries in the Event List window, which can be edited numerically (and will then affect the graphics, in turn). Examples of this include dynamics and slurs, which produce a type of pseudo-MIDI data called META events in the Event List window.

LOGIC has a high degree of intelligence in how it interprets MIDI note data to produce a readable display. This intelligence is called *Interpretation* and you have control over just how much of it you need to make your music look right.

This has implications for how you work.

- When you want to produce a tied or dotted note, you'll probably just lengthen the note's MIDI data, instead of added a graphic dot, or creating a new note, and adding a graphic tie. When you lengthen the note's MIDI data, LOGIC will take care of making the note length display properly, depending on your *Interpretation* settings. The amount and type of *Interpretation* can be set individually for each sequence, and turned on and off for individual notes. You're in control.

- You don't usually need to supply rests (although you can if you wish). LOGIC supplies rests automatically, based on its *Interpretation* of your note lengths.

- When you enter a note requiring an accidental into the score manually, you don't plant the note, and then the accidental. Instead, you plant the note you want by listening as you drag the note into the score, and reading the display to determine what note it is. The accidental is automatically supplied.

- LOGIC follows the normal rules of musical notation regarding stem direction, application of ties, beaming, accidentals, etc. You can edit any of these things locally for individual notes, however.

Notes are displayed the same way, regardless of whether they were recorded in real-time, step-time or using mouse entry.

• You can add text, lyrics, chord symbols and musical graphics of all types using the mouse and the Partbox, a sort of repository of available symbols. These can all be freely edited after insertion. They all produce entries in the Event List window, as well.

Elements to define the Appearance of the Musical Staff

Score Styles

You have complete control over many aspects of the notation using *Score Styles*, including:

• Size and number of staves (and brackets/bar line connections)
• Default clef sign(s)
• Default settings for display of rests, stem directions, tie and tuplet directions, beaming
• Transposition
• Space above and below the staff
• Levels of polyphony

Each sequence can have its own *Score Style*, though many sequences can share the same one if it is convenient for your score. Instruments can also have their own default *Score Style* so that you don't have to set one for each new sequence you record. While many *Score Styles* are supplied, you can edit and make as many as you wish.

Instrument Sets

Instrument Sets give you control over:

• Which sequences are displayed in score
• Score order (independent of order on the Arrange window)
• Bracketed systems and connected bar lines between staves
• Instrument names, and the position of the label

There's more on this subject in the section *Instrument Sets* on page 12 - 56.

Text Styles

Define as many combinations as you wish of font, size, style, etc., for later use in your score, and for use by the system for things like bar numbers, page numbers, chord symbols, repeat endings, tuplet numbers, etc. For details, see the section *Text and Text Styles* on page 12 - 64.

12

To enter the Score window

1. Double-click on a sequence object in the Arrange window. The Score window will appear and display notation of the sequence.

*   2.Or, select an object on the Arrange window, and select **Win-dows > Open Score** (or just press ⌘ 3ʳ).

*   3.To return to a window that's already open (if it's buried too deep to find), go to the Windows menu and select the one you want by name. The currently open windows are listed by name, under each type of window. This is the best way when a window already exists that's set up like you want it, even if the window is currently hidden from view. If you constantly open new windows instead of returning to existing ones, you'll have many open windows showing the same information, which slows the program and may confuse you.

What's in the Window

On the left-hand side of the Score Edit window, under the selection box for the Instrument Set (❶), you should be able to see the Display Parameter box (❷), the Event Parameter box (❸), die Toolbox (❹) and the Partbox (❺). The main working area (❻) has two kinds of display, linear view and page view, and can be switched between these two with the Page Edit button (❼).

12.1   Display Features

Adjusting the view

Linear view, page view, print view

Normally your music is displayed in a continuous scrolling stream from left to right. If you prefer, you can select Page Edit from the View menu. The music will be displayed in a page-orientated format, and the Song Position Line will go from line to line as you play back the music. However, notice that the Bar Ruler is missing in Page Edit mode. Selecting Print View (View menu) shows margins as well. You can edit in Page Edit mode, though the screen changes may be a little slower.

To return to linear view, just select **Page Edit** again; that will disable page view. There is also a Key Command for Page Edit, which defaults to ⌃P.

Repeated clef signs for new sequences in linear view

When you're in a linear view (*page edit* is off), you'll notice that successive sequences in the same track are displayed with new clef signs, even though no actual clef change has happened. In *page edit* the extra clef sign won't be shown, so the music will print properly.

Changing the general appearance

Song Settings > Numbers & Names

Use this window for *settings relating to bar numbers, page numbers, instrument labels* in score. You can turn them on/off, set positions, fonts, etc.

Song Settings: Guitar Tabulature

Use this window to define the way your guitar tabulature looks.

Song Settings > Global Format

Use this window to make settings relating to margins, spacing and proportions of the note display, slanted beaming style, density of bars per line, etc.

12

Song Settings > Clefs & Signatures

Use this window to make settings relating to Clefs, Key and Time Signatures.

Song Settings > Extended Layout Parameters

Use this window to fine-tune the score layout to you personal taste.

Attributes: How the notes look and interact

Many different options for stems, accidentals, beams, ties, grace notes, etc.

Appearance of Folders and Voices

Explode Folders

The »*Explode Folders*« option on the View menu allows the Score window to do something unique among LOGIC's windows. It allows you to view simultaneously the contents of multiple folders, *in the same window*. It is especially useful in Page Edit for viewing/printing scores from complex arrangements.

Reminder: the current Instrument Set will still control what you actually see.

What you see will also be determined by what level of the arrangement you're viewing. You'll see the contents of the current folder and any folders it contains. You won't see the contents of any folders at the same level or higher in the hierarchy. The nested structure as defined by the folders is retained, even if there is no direct visual evidence of this because of the Full Score display.

Reminder: if you can't remember what level you're working on, look in the Score Editor window's title bar. You can move up and down the hierarchy in all the usual ways, using the title bar as a reminder.

Explode Polyphony

For manually entering polyphonic notation directly into the Score Editor (or editing it), you are given the special function »xplode Polyphony«.

Explode Polyphony is toggled on and off like other View menu options, by simply selecting it. However, you *must* be in Linear view (not Page view) in order to toggle »*Explode Polyphony*« on and off, although you

can enter Page view with it either on or off. In Page view, the option is not available on the View menu, so you must return to linear view in order to change it.

Before using this option, you must first define a polyphonic Score Style, using a different MIDI channel for each displayed voice on the same staff. See the section *Score Styles* on page 12 - 33 and thereafter for more details.

When you choose »*Explode Polyphony*« from the Score window's View menu, a polyphonic-voice stave is »exploded« into as many single staves as it has voices. This allows you to edit each voice separately without fear of affecting the others. When you've finished, you simply deactivate the function to recombine the voices.

Here's an example of a polyphonic Score Style. Notes that are intended to be in the lower voice (stems down) are changed to MIDI channel *2* in order to take advantage of this Score Style.

Remember that the MIDI channel of data in the Score or Event List windows has no bearing on the actual playback MIDI channel, unless the sequence is played by an Instrument which is set to MIDI channel *ALL*. This allows complete freedom to edit the MIDI channel in the Score window for display purposes, without affecting playback.

12

Here is an example in score notation. In the upper example, »*Explode Polyphony*« is on, and in the lower example, the voices are recombined

as the function is turned off.

There is a Key Command available for Explode Polyphony, which you can set in the Key Commands window.

The Display Parameter Box

▷ A FEW NOTES

The display parameter box is located on the left side of the Score Edit window, immediately below the Instrument Set label and the chasing/linking icons. You use the settings in this box to control exactly how LOGIC will interpret your music as readable notation. The values here are changed the same ways as in parameter boxes in other windows: by using flip menus, toggling *ON* or *OFF*, or by direct numerical editing.

If you've selected a single staff (representing a single sequence), its sequence name appears next to the »hide/show« triangle. If several sequences, staves or folders are selected, the number of selected objects is shown here instead of names. This example shows that *2 sequences* have been selected.

Assigning the Styles

Bass
Piano
Treble
Treble+8
Treble-8
Alto Sax
Bariton Sax
Contrabass
Guitar
Guitar Mix
Horn in Eb
Horn in F
Organ 1+2/3+4/5

The next parameter down is the Style selector. Clicking and holding on it produces a flip menu from which you can select one of the available Styles, and this is then applied to the selected sequence(s). A few of the default styles are shown here. All of these can be edited on the Score Style window, and you can also define new styles there.

Style selection follows the same logic as that of the other parameters. It affects any selected sequences/staves.

Display Quantize (»Qua«)

Since no one plays with mechanical perfection, some quantization of the notation display is necessary to produce readable notation. Otherwise (as mentioned earlier) the 8th note that you played slightly early might look like a 96th note tied to an 8th note, unless you quantize the notes themselves in another window. But unlike quantization on the Arrange window, display quantization affects only what you see, never what you hear.

Here is the flip menu for the »*Qua*« parameter. You get binary (e.g. »$\frac{1}{8}$«, »$\frac{1}{16}$«, »$\frac{1}{32}$«) and triplet (e.g. »$\frac{1}{12}$«, »$\frac{1}{24}$«, »$\frac{1}{48}$«) resolutions, plus hybrid ones that combine the two. For instance, »$\frac{8}{12}$« will correct the display of eighths and eighth triplets. A pure triplet »$\frac{1}{8}$« quantization is achieved with »$\frac{4}{12}$«.

The hybrid resolutions and higher resolutions require more accurate playing or quantization of the actual data (on the Arrange window or Event List) for readable results. Otherwise, you'll see small note values you did not intend.

The »*Default*« value adopts the global display format's value as seen in the Transport window. If the global format is a binary one, the actual display quantization used is the hybrid resolution featuring the next triplet resolution down. So, if the display format reads »*16*« (for $\frac{1}{16}$th notes), the actual »default« display format will be »$\frac{16}{24}$«.

```
default
4
4,3
4,6
4,12
8
8,6
8,12
8,24
16
16,12
16,24
16,48
32
32,24
32,48
32,96
64
64,48
64,96
64,192
```

»Qua« resolution	smallest binary value	smallest triplet value
default	see above	see above
4	$\frac{1}{4}$	–
$\frac{4}{3}$	$\frac{1}{4}$	$\frac{1}{2}$ triplets
$\frac{4}{6}$	$\frac{1}{4}$	$\frac{1}{4}$ triplets
$\frac{4}{12}$	$\frac{1}{4}$	$\frac{1}{8}$ triplets
8	$\frac{1}{8}$	–
$\frac{8}{6}$	$\frac{1}{8}$	$\frac{1}{4}$ triplets

12

»Qua« resolution	smallest binary value	smallest triplet value
$\frac{8}{12}$	$\frac{1}{8}$	$\frac{1}{8}$ triplets
$\frac{8}{24}$	$\frac{1}{8}$	$\frac{1}{16}$ triplets
16	$\frac{1}{16}$	–
$\frac{16}{12}$	$\frac{1}{16}$	$\frac{1}{8}$ triplets
$\frac{16}{24}$	$\frac{1}{16}$	$\frac{1}{16}$ triplets
$\frac{16}{48}$	$\frac{1}{16}$	$\frac{1}{32}$ triplets
32	$\frac{1}{32}$	–
$\frac{32}{24}$	$\frac{1}{32}$	$\frac{1}{16}$ triplets
$\frac{32}{48}$	$\frac{1}{32}$	$\frac{1}{32}$ triplets
$\frac{32}{96}$	$\frac{1}{32}$	$\frac{1}{64}$ triplets
64	$\frac{1}{64}$	–

»Interpretation«

If a sequencer is to display a piece that's been recorded in real-time in a readable form, without affecting the original MIDI data in the sequence, it needs to be able to correct the display of the note lengths. Otherwise, quarter notes played staccato (to take an example) could be displayed as, say, $\frac{1}{32}$nds with a host of rests after each note.

One of the most powerful display functions of LOGIC is its ability to suppress the display of rests that could crop up between the position of a note and the beat's end point: and this is controlled from the »*In-*

terpretotion« parameter in the Display Parameter box. *Interpretation* also suppresses the display of overlaps that can affect readability.
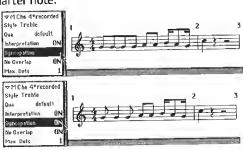
Interpretation is toggled *ON* or *OFF* (no entry shown in the box) for all selected sequences by clicking to the right of the word »*Interpretotion*« in the Display Parameter box. To see how it works, just record something with several short notes, and turn »*Interpretation*« *ON* and *OFF* to see how it changes your music.

Interpretation can be turned *ON* and *OFF* for any selected notes in the Attributes menu. This allows a mostly interpreted sequence, with some uninterpreted notes, or a mostly uninterpreted sequence with some interpreted notes.

»Syncopation«

Where they occur, syncopations are normally displayed as smaller note values tied across the beat, allowing the beat to be seen. As an alternative, you can choose a syncopated display that shows the actual note values.

Example: Suppose you wish to show the second note of the phrase »$\frac{1}{8}$th - $\frac{1}{4}$ - $\frac{1}{8}$th« as being syncopated. Normally, the second note is displayed as two tied $\frac{1}{8}$ths: enable »*Syncopation*« and the tied notes become a quarter note.
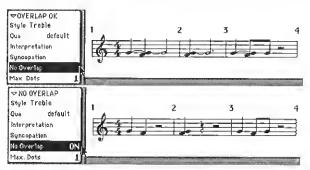
Notice that syncopated, tied 16ths are shown with a single 8th note, even when *syncopation* is turned off for the sequence.

Syncopation is toggled *ON* or *OFF* (no entry shown in the box) for all selected sequences by clicking to the right of the word »*Syncopation*« in the Display Parameter box.

Syncopotion can be turned *ON* and *OFF* for any selected notes in the Attributes menu. This allows a mostly syncopated sequence, with some unsyncopated notes, or a mostly unsyncopated sequence with some syncopated notes.

»No Overlap«

»*No Overlap*« suppresses the display of portions of a note which extend past the beginning of new notes. It also tends to shorten notes to match the length of the shortest of a group that begins at the same time, in order to suppress strange-looking ties. It is normally left permanently *ON*, although the Interpretation mode contains some overlap correction as well.

Notice that »*No Overlap*« affects: bar 1, where "F" starts before "G" is finished; bar 2, where "F" and "G" begin at the same time, but "F" is shorter; bar 3 similar to bar 1.

»*No Overlap*« is toggled *ON* or *OFF* (no entry shown in the box) for all selected sequences by clicking to the right of the word »No Overlap« in the Display Parameter box.

Remember that »*No Overlap*« only changes how your music is displayed, not how it sounds. If you want to actually remove all overlapping note lengths, you can do it using the Functions menu option, »*Note Overlap Correction*«. See the Functions menu description for important details.

»*Interpretation*« and »*No Overlap*« should be disabled if you are entering notes manually and not in real-time. If you don't, you may find that placing a $\frac{1}{16}$th on the downbeat results in it being displayed as a $\frac{1}{4}$ note, and »*Overlap Correction*« may attempt to shorten notes in unexpected places.

»Max. Dots«

This parameter allows you to determine the maximum number of dots each dotted note is allowed to display. If the value is »*1*«, you prevent the display of double or triple dots. If the value is »*0*«, no dots will be allowed.

A working suggestion

Since all the Display Parameters affect only your notation display, and not the sound itself, there is no harm in experimenting with different settings. If you find yourself making lots of small edits in order to get the results you want, or can't get those results at all, consider making it a habit to try different settings.

12.2   Editing Events

As well as parameters governing the way notes and other events are displayed, the Score Edit window also offers the chance to edit the displayed events.

This section only describes editing in Score Edit window. More general hints on editing can be found in Chapter 4 *Using LOGIC,* and Chapter 8 *The Editor Windows.*

The Event Parameter Box

The values of the different parameters of an event or a selection of events are displayed here and can be edited. The exact parameters which will be displayed depend on the type of event(s) you've selected.

Editing single events

Note events are shown with MIDI channel, pitch, velocity and note

```
▽    1 Texts sel.
Stave              1
Lyric
Style Plain Text
Align             ⊢
Size             10
Font  Chicago
vert. pos     + 76
hor. pos      –  4
```

```
▽    1 Notes sel.
Channel            1
Pitch             E3
Velocity          80
Length    _    2  0 236
```

length. The note length is shown here as on the Event List. All edits can be made numerically or with the mouse, just as on the Event List.

You can set some parameters for *text events* which can be defined for m*usical symbols* as well, like staff assignment and vertical and horizontal position. (The example Event Parameter box shown here refers to a forte symbol, f .) Staves are numbered from the top down for each individual score style, with the highest staff counted as "*1*". Vertical and horizontal position are measured from a "zero" position at the actual musical time of the event. For the f , the Symbol number happens to be "*5*", though it's much faster to change a symbol with the mouse than it is by typing in different numbers. Nevertheless, the typing approach can come in handy if you're working with several symbols which you've selected at once (for more on this, see *Editing multiple events* on page 12 - 15).

```
▽    1 Symbols sel.
Stave              1
Symbol             5
vert. pos     + 62
hor. pos      –  4
```

Fine-tuning events using vert.pos and hor.pos

The best way to do this is to place events as closely as possible to the ideal time location without making large changes to the horizontal position parameter, by using the mouse as described in the Toolbox section and the Tutorial section. Then, fine-tune them with the Event Parameter box *vert.pos* and *hor.pos* parameters.

Remember: the displayed location of an event on the page depends heavily on the actual bar and beat in which the event occurs. **Avoid using the** *hor.pos* **parameter to move an event out of the bar in which its time position occurs**. Doing so may result in events being displayed on the wrong line in page mode, and incorrect printing.

Other text parameters

In addition, *text events* have several other settings.

• The text can be a lyric (with auto spacing on the note or musical time) or a regular text.
• Any defined text *style* can be selected from a flip menu. (Just click/hold on the *style* name. The Text Style window can be opened by double clicking the style name.)

Logic

- The *align*ment of the text relative to its musical position can be altered. The symbols for *align*ment mean (top to bottom): left-justified, centered or right-justified on *the event time*, left-justified on the page or the left margin, centred on the page, or right-justified on the page or right margin.
- *Size* can be numerically edited, in points.
- *Font* can be changed, using a flip menu (just click/hold on the font name).

The event parameters for other types of events are similar, and are edited in the same ways.

Editing multiple events

When multiple events are selected which have different values for a particular parameter, an asterisk is shown, instead of a value. Any changes made to that parameter will be relative to the starting value in each selected event. For example, in the case of several notes, changing the velocity will affect the overall velocity of all the selected notes, while keeping the relative velocity phrasing you started with.

If you want to assign the same value to several selected events, just hold [⇧] while making the change.

You can also edit the vertical and horizontal position of text or graphical symbols. If you select more than one symbol, any value change will alter the position of each symbol relative to the starting position of each symbol. But if you insert a different value while pressing [⇧], all symbols are set to the same position.

Arranging the symbols you add

In addition to the edits you can perform via the Event Parameter box, there are a few special key commands for arranging several selected symbols at once.

- *Align Object Positions Vertically*
- *Align Object Positions Horizontally*
- *Align Object Positions*

These functions arrange all the selected items according to the position of the first one you select.

The first of the three arranges the symbols at the same height relative to the staff they belong (this is the equivalent of NOTATOR SL's old "Shift F" function).

12

The second aligning function arranges the symbols at the same horizontal distance from the current Song Position line.

The third command, "Align Object Positions", carries out both the above functions simultaneously.

The three commands affect the following types of object:

- Dynamics symbols
- Accent marks
- Trills
- Crescendos
- Slurs
- Pedal symbols
- Text
- Lyrics
- Chord symbols
- Arpeggiosymbols
- Repeat brackets

If just one object is selected, a dialog box will appear asking if you wish to arrange all the objects of this type that come afterwards. This makes it easy to give all the objects of a particular type the same relative position: just move one of them to the place you want and select "Align Objects...".

Insert Defaults

If no events are selected, this box shows the *Insert Defaults* that control MIDI channel and velocity of the notes to be inserted from the partbox, and the Text Style and Lyric Mode for the Text cursor. The insert defaults are automatically updated when you make a selection. This is convenient if, for example, you want to add notes to an existing chord. Simply clicking one of the chord notes will set the partbox MIDI channel and velocity accordingly.

When you paste notes into a score from the clipboard, they appear at the currently selected song position, rounded to the current Format value.

Selection with the Event Parameter box

The following functions (on the left below) are all carried out by clicking on the title line in the Event Parameter box — which function actually operates depends on the current situation. The text on the right explains which function will operate under which circumstances:

Logic

Select All: when no events have been selected;

Deselect All: when one or more events are selected;

Select Similar Events: when one or more events are selected and the
                        🔼 key is held down.

Editing notes

Changing the velocity of notes

By clicking on single (or a selected group of) notes with the 'V' tool, you
can change the velocity of the note (or notes) with a simple movement
of the mouse: upwards increases the velocity, downwards decreases it.

In chords, only the notes you select are altered in this way, although all
the notes in the chord are of course still sounded, irrespective of
whether they have been selected for alteration or not. This makes it
easy to adjust the relative velocities of notes in a chord. To alter the
whole chord, just ensure you select all the notes in the chord before
you use the 'V' tool.

If the MIDI OUT button in the window is active, you will be able to hear
the changes you make instantly.

In Page view, you can change all the selected note velocities — even if
the notes are from different sequences. However, only the notes from
the currently selected chord are sent to the MIDI OUT.

Relative and absolute changes in velocity

As usual, when you have selected more than one note, their values may
be altered whilst preserving their relative velocity to one another, until
one of the selected values hits the maximum or minimum value (0 or
127). Holding down the 🔽 key at this point allows you to continue
changing the velocity.

Holding down the 🔼 key while changing velocities effects an absolute
change in the values. Here the average velocity of all the selected notes
is applied as a starting point to all of the notes.

Quick velocity changes

You can quickly change to the 'V' tool at any time by hitting ⌃⇧.

Reminder: Clicking on notes while holding down the ⌃ key is used in
the score window to shift notes around — so take care.

12

12.3   Partbox

The Partbox is the source of all graphic items that can be inserted into the score with the mouse. This includes notes, text, dynamics, articulations, slurs and all other types of musical symbols. Here is what the top part of it looks like.

As you can see, each *symbol button* is in a different category of musical graphic. Clicking on one of them causes all the possible selections of that type to appear directly below, so that you can choose the exact one you want. For example, to see all the possible dynamic selections, you would first click on 〖fp〗 .

This will cause the entire list of available dynamic settings to appear at the top of the list in a *symbol box*, from which you can select the specific one you want.

ppp pp   p mp
mf   f ff fff
sfz sf fp
fz

Another method of getting access to all the symbols of a particular sort is to click/hold on a symbol button. As you hold the mouse button, a flip menu appears containing all of the symbols of that sort. You can then select the one you want to drag into the score.

Inserting notes or symbols with the mouse

Using the symbol button flip menus

Click and hold on one of the symbol buttons at the top of the Toolbox, select the desired musical symbol from the symbol flip menu that appears (like the note flip menu shown above), drag the symbol *sideways* into the score where you want it to go, read the *info line* to verify it is in the right place, and release the mouse.

Using the symbol boxes and pencil tool

Select the *pencil* tool from the Toolbox, select the desired musical graphic from the Partbox, click/hold the score where you want it to go, read the *info line* to verify it's in the right place, and release the mouse.

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Using key commands

Before you insert a symbol onto a staff with the pencil tool, you can take advantage of the following keyboard selection commands:

- *Next Partbox Symbol, Previous Partbox Symbol*

These commands select the next or previous object in the currently active partbox group, e.g. the different note values in the note group.

We recommend you assign these commands to the right/left cursor buttons, together with one of the modifier keys that you haven't used yet.

- *Next Partbox Group, Previous Partbox Group*

These commands select the next or previous partbox group. If the Score Partbox in the View menu is set to "Show All Groups", the groups will be selected in vertical order, provided they are visible on-screen. If "Show All Groups" is switched off (i.e. only the active group is visible), the groups will be selected in the same order as on the Group Select icon.

We recommend you assign these commands to the up/down cursor buttons, together with an as-yet-unused modifier key.

The following key commands permit direct access to the various symbols in the note partbox:

- *Partbox: 1/1 Note*
- *Partbox: 1/2 Note*
- *Partbox: 1/4 Note*
- *Partbox: 1/8 Note*
- *Partbox: 1/16 Note*
- *Partbox: 1/32 Note*

If you use these commands over and over again, you switch between the binary, ternary und dotted values for that particular note, e.g. 1/2 note –> 1/2 triplet –> dotted 1/2 note –> 1/2 note ... etc.

Using floating palettes

If you double-click on a *symbol button*, a floating small palette appears (looking like a small partbox), with an extended list of all possible values or graphics of that type. You can drag it (by the top bar, like any other window) wherever you want to, even over the top of the score, to make it more convenient to change note value as you work. When you've finished with it, click on the »closebox« symbol in the upper left.

12

Here's an example of the floating palette for notes. You'd get this by double-clicking on the note head, the dot or the »3« at the top of the Partbox. Notice it contains all the values possible for notes.

The appearence of this floating window is set in the Score Preferences, but can be overridden by holding down one of the modifier keys while you open the palette (by double-clicking on the Partbox group):

⌃ctrl⌄	opens the standard palette,
⌥	opens an upright palette,
⌘	opens a horizontal palette.

You can have as many of the floating palettes as you need at once, showing any combination of musical graphics, positioned for most convenient symbol entry into your score. They're always the top window, as with Transport windows, so you won't lose them behind larger windows.

You drag notes directly out of a floating palette, with either the pencil tool or the pointer tool. Very similar processes are used for entering other musical symbols, as we'll see a little later.

Selecting an item from a floating palette automatically "loads the pencil" for repeating entry of similar items into the score without the need to reselect the symbol each time.

Adding symbols to several sequences at once

In Page view, you can add symbols from the partbox into all currently selected sequences at the same bar position, by holding down the ⌂ key as you add the symbol. The symbols can then be individually edited, just as though you had added them individually.

This mode of insertion is indicated by the words "Insert Multi" in the Info line.

In "multi-sequence insertion mode" you can insert symbols, notes, user rests and text objects (even lyrics, if you wish).

Multiple pasting from the clipboard...

The 'Multiple Paste' option can be accessed in the Score window via a menu (**Edit > Multiple Paste**) or a key command. The command is assigned to the default key combination ⌘⌥⌵.

In Page view, the contents of the clipboard are added to all currently selected sequences, rather like the adding with the ⌂ key held (see above).

Reminder: When more than one sequence is selected, the standard copy/paste commands handle each sequence separately. In other words, if several sequences are selected when copying, then the selected events in all these sequences will be copied to separate "sequences" in the clipboard. When pasting in page view, LOGIC will then insert the previously copied events into the selected sequences from each individual clipboard sequence. So, although theoretically copied to or pasted from one clipboard, events from several separate sequences are still handled separately.

... and at the original position

The keyboard command *Paste Multiple at original Position* inserts copied events back at their original position, irrespective of the current song position.

Setting the MIDI channel and velocity before inserting notes

To *control the MIDI channel and velocity of inserted notes,* use the Event Parameter box. When no events are selected, the Event Parameter box shows the »*Insert Defaults*« that will be used for inserted notes and text events (covered later).

To make sure no events are selected, just click on the score with the pointer tool above or below the staff, where there are no notes or other musical symbols. Any selected notes or other graphics will stop flashing. The Event Parameter box will look like this:

Now, whatever MIDI channel and velocity you set will be used for any new notes that you insert. Remember that the MIDI channel of individual notes has no effect on playback, unless the MIDI channel of the entire sequence is set to »*ALL*« in the Instrument Parameter box (in the Arrange window). However, the MIDI channel you set here can be used to control the display of polyphonic »stems up, stems down« notation in the staff, if you're using a polyphonic Score Style (see the section *Score Styles* on page 12 - 33 for details).

Quantization of inserted notes and other objects

To make precise positioning with the mouse easier for you, LOGIC works on the following principles: first, notes can only be placed on bar positions which are divisible by their length values — so whole notes can only be inserted at the beginning of bars, quarter notes exactly on beats and sixteenth notes on the $\frac{1}{16}$ divisions. This is not a limitation however, as each note can be moved freely once it has been inserted.

You will find more information about moving notes and other objects in the Tutorial section.

NB: if you have accidentally inserted a note or other object in the wrong place, you don't need to change tool to correct it. Click and hold the inserted object with either the pointer tool or the pencil tool. You can now move it. When you click on objects that have already been inserted, the pencil behaves just like the normal pointer. This also avoids inserting identical objects at the same position with the pencil tool.

The Score Editor info line

As you know, LOGIC helps you when inserting, moving, selecting or deleting notes via the »info line«. This automatically opens whenever you perform any of the operations described above and is located directly under the Score Editor window's title bar.

When inserting notes, the info line shows the following (from left to right):

- The type of operation (Insert);
- The current position;
- The type of object (Note);
- Its MIDI channel;
- The current pitch;
- The velocity value;
- The length.

Insert		2	3	1	1	NOTE	1	03	64	_	_	3	232

So long as you »keep hold« of a note or other object by holding down the mouse button, you can move it freely around the screen and refer to the info line for an update on its current status. Only when you release the mouse button will it be inserted. If you have enabled the MIDI Out icon (in the upper left of the window), you will hear the note pitch change as you move the mouse up and down prior to releasing it.

Partbox Symbols

Notes

The Partbox contains three note groups with simple, dotted and triplet note values. These groups can be activated by clicking the according section of the note group icon. The Midi channel and velocity value for the inserted notes can be set in the *Insert Defaults* parameter box.
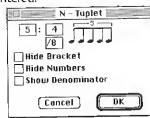
N-tuplets

LOGIC supports tuplets with values up to 64. The bracket with the "n" inside (called the "n-tuplet" bracket) can be added to a note by dragging it onto the note and releasing it. (The note will sound and its entry will appear in the Info line to let you know you've got it.)

After you release the mouse, the following dialog box will appear. You can numerically edit the way the tuplet will display by changing the numbers, and/or selecting the check boxes. When you edit the numbers, the displayed sample tuplet will change to show you the result of your edit. If you like the result, click *OK*, and it will be applied to the n-tuplet you've just entered.
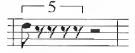
This set of numbers means that five notes will be displayed in the same musical space in which four 8th notes would have been displayed.

- The left-hand number (*5* above) is how many notes are in the tuplet.

- The right-hand numbers define the musical space into which the tuplet must fit, and the sub-division (in ordinary duplet values, not triplet ones, etc) with which the notes will be displayed. In this case, five notes will fit into the space of four 8th notes, and use 8th note beaming.

- Use the sample tuplet in the dialog to verify your edit before click-
ing *OK*.

After you click *OK* to accept your edit of the n-tuplet, here is what you'd
see (assuming you'd applied this tuplet to an 8th note in the first

place).

To fill out the rest of the tuplet, you could use the mouse to enter 8th
triplets on top of each of the 8th rests. (8th triplets are slightly shorter
than the actual value, so they'll fit without overlapping.) Then you'd
see a complete 5-tuplet like this.

It's also possible to apply an n-tuplet to a MIDI recording that includes
attempted, but slightly incorrect tuplets performed in real time. If the
performance is accurate enough, and the correct sub-division is ap-
plied, over-mechanical quantization will be avoided.

By checking the appropriate boxes in the n-tuplet dialog box, you can :

- Hide the bracket itself.
- Hide the number in the bracket.
- Display the subdivision (or denominator).

- Change the direction of each n-tuplet stem (upward/down-
ward/auto select setting).

To *delete* an n-tuplet bracket, click on it with the eraser tool. This will
affect only the bracket, not the notes themselves. To *edit* an already ex-
isting tuplet, double-click on the tuplet number (or on the middle of a
bracket if the number is hidden). This also works for the automatic tri-
plet symbols provided by the program, should you wish to edit one of
them. If both numbers and brackets are hidden, the numbers will be
shown on the screen in round brackets, e.g. »*(3:2)*«, so that they can
still be edited. They will disappear completely in the printout.

N-tuplets to go — quick insertion

If you add an n-tuplet whilst holding down the ⌨ key, an n-tuplet will be inserted using the same parameters as last time, and the dialog box won't bother to open.

Additional points:

- The Tuplet direction can be set in the Score Style window separately for each voice.

- The font, size and text effects for the tuplet numbers are set in the Text Style window (row »*Tuplets*«).

- Tuplets can start with a user (manual) rest. Just plant the rest, and then drag a tuplet bracket to it.

- Tied pairs of notes within a tuplet group are contracted to one double-length note. This is also true for paired rests. This allows the display of certain compound rhythms that combine duple and non-duple values.

Pedal symbols

The pedal signs represent MIDI Control Change 64 (sustain pedal). They insert that MIDI event into the corresponding sequence for output over MIDI. After one of the two signs is inserted using the pencil tool, the other one becomes automatically selected so that pedal movements can be quickly entered without continuous recourse to the symbol box.

The clefs

LOGIC's data format distinguishes between two types of clef:

- *The basic clef*: displayed in the first bar or at the beginning of a stave. You define the basic clef in the Score Style window for whichever is the active Style at the time. If you edit this clef graphically (see below), it also changes the corresponding Score Style, which will affect other sequences being displayed with that Style.

- *A clef change*: clefs which you have taken from the partbox's symbol box take effect from the time position at which they are inserted. You can have clef changes whenever and wherever you like, even in the middle of a bar.

You can edit either type of clef after entry by double-clicking on them.

If a piece requires just one clef for its entire length, use the basic clef defined in the Style or choose a Style with the appropriate clef.

For more on how clefs are displayed, read the section *Score: Clefs & Signatures* on page 14 - 20. This contains information on how to set global parameters for clef display.

You can open this dialog box by double-clicking on a clef whilst holding down the ⌨ key.

Dynamics symbols

The dynamic signs »*ppp*« to »*fff*« can be inserted wherever you like in the notation. They are purely graphic and have no effect on the MIDI output.

The note heads
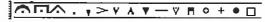
Notes can be given different head styles. To give a group of notes the same note head, select them and apply the desired note head to one of the notes.

To get back to the original note head, apply the »*quarter note*« head to the selection.

Articulation symbols (fermata, handgrip, accent, staccato, etc.)

These symbols are assigned to individual notes when they're inserted. They are automatically positioned relative to the note for which they are intended, taking pitch and time position into account. Any change to a note (transposition, moving, copying, deleting) affects the related symbols as well.

To assign one of these symbols to a note, enter it onto the note so that the note appears in the info line (you'll hear the note sound). There's usually no need to worry about the symbol's exact position as this is determined by the program.Fermata and accent symbols can also be attached to manual rests.

If you want to control the exact placement of any of these symbols, place it with the mouse while holding ⌨. The symbol is then totally independent of any notes, and can be dragged anywhere.

A symbol can be applied to more than one note at a time if you select the notes and enter the symbol onto one of the notes.

The combined stress symbol '≥ ' appears above notes and outside the staff. If it is assigned to a note in a polyphonic score style, whose voice is displayed using upwards-pointing notes, then the '>' and '_' symbols will be printed under the note the opposite way around.

You can delete any one of the symbols by clicking directly on it (it will flash) and choosing *Clear* from the Edit menu.

Slurs, crescendos, lines and arrows

The objects in this group can be placed anywhere in the notation and

the form they take may be altered at any time. You may find it easier to fine-tune the position of these at higher zoom levels.

Editing slurs

Enter the slur using the pencil tool or drag it from the partbox. Slurs have five draggable edit points.

The first point allows you to move the whole object. The final length of the slur depends on the musical content, so that a slur always adapts to changes in the bar width after copying or moving operation. Points 2 to 4 alter the slur's left, middle and right zones. The last point determines the length and rake of the slur. Slurs are automatically divided in half if they fall on a line break in Page edit, and remain fully editable.

Editing lines and arrows

To enter lines or arrows, select the desired object from the symbol box and position it so that its lefthand end is where you want it in the notation. Release the mouse button — you can now determine the position of the other end by grabbing it and placing it where you want it. The length of lines and slurs may also be edited in the Event List.

Vertical and horizontal lines remain vertical and horizontal during editing.
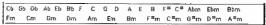
Editing crescendos/diminuendos

Crescendo/diminuendo symbols are placed similarly to lines and arrows, but have three edit points that can be dragged. The first point allows you to move the whole object. The upper point determines the angle and length and the lower point the length and rake (crescendo) or vice versa (diminuendo). These symbols are also intelligently handled at line breaks. The length of crescendos can also be edited from the Event List.

Keys and how to change them

Key signatures can be entered anywhere in a stave. The one at the earliest time position is taken as the basic key signature. Accidentals will be automatically applied where necessary.

Cb	Gb	Ob	Ab	Eb	Bb	F	C	G	D	A	E	B	F#	C#	Abm	Ebm	Bbm
Fm		Cm		Gm		Dm		Am		Em		Bm	F#m	C#m	G#m	D#m	A#m

To enter a key, select it in the symbol box and place it in the notation.

You can edit an existing key signature by double-clicking it, and selecting from the dialog box that appears.

For more on how to copy all key signatures between songs, please read the section *Copying Time Signatures between Songs* on page 5 - 8.

Time signatures and how to change them

Time signatures can be placed at any time position. The one at the earliest time position is taken as the basic time signature.

To enter a time signature, you can select the »*(A/B)*« from the symbol box and place it in the notation. A dialog box appears, in which you can choose the value. The other time signatures are also available as individual objects and can be directly inserted from the input dialog box.

Time signatures act globally for all levels: two cannot be active at the same time position.

A time signature acts, not just on a sequence or folder, but on the whole time axis of the song at that particular position. If, say, you have a time signature change at bar *5 1 1 1*, that's how it is throughout the song's levels.

Time signatures have no effect on what you hear, only on the way the music is presented on the screen, e.g. in the event list, the bar ruler and in many other areas, including the transport areas. Cut and copy

operations function in the within the prevailing time signature. The count-in and metronome also obey all changes.

You can edit an existing time signature by double-clicking on it, and selecting from the dialog box that appears.

Time signatures can be inserted at the current time position using the horizontal Transport window. There's more on this in the section *Time Signature and Divisions* on page 5 - 7.

Compound time signatures

Compound time signatures can be set up in the time signature dialog box — e.g. (2+2+3) / 8. To do this, click on the words *Beat Grouping* and enter the combined numerator for the time signature. "+" signs may be omitted — so instead of "2+2+3", you could simply type "223" . The values you enter are then automatically added to create the numerator.

The note display interpretation and grouping follow the *Beat Grouping* setting.

To enter a new combined time signature, you can also drag the 'A+B/C' symbol (see above) out of the partbox onto the staff. A dialog box then opens with an active Beat Grouping entry field. By entering (say) "3+4/ 4", you can set the bar denominator at the same time.

If *Print Compound Signature* is checked, the individual numerators will all be displayed (and printed) separately. If this option is off, the normal (summed) numerator will be displayed and printed.

To erase the compound structure and return to normal grouping, delete the parameter value entered in the *Beat Grouping* field.

For more on the on-screen representation of time signatures, read the section *Score: Clefs & Signatures* on page 14 - 20.

Repeat signs and bar lines

To insert repeat signs, just drag them from their symbol box and place them on the desired bar line. The same goes for other linking symbols like double bar lines, dotted bar lines, half-size bar lines, freely position-able bar lines and repeat brackets.

If you're using a multi-stave system for which you have already defined a Score Style and/or Instrument Set that connects bar lines between the staves, the inserted repeat signs, etc. will also span the staves.

The available signs are left and right repeat signs, ending bar line, dou-ble bar, double repeat sign, dotted bar line, half size bar line, and re-peat ending bracket (for 1st and 2nd endings, etc.).

To delete bar line changes: The eraser tool deletes these symbols and restores the former bar lines.

Placing and editing the repeat ending bracket

After entering this symbol, a text cursor appears. Type in the required number or text, and press ⏎. A one bar long ending will appear.

To select a bracket, click anywhere on it.

The entire object can be moved vertically and horizontally, by dragging from the middle of the bracket. The left and right corners can be edit-ed by dragging from the corners, without moving the entire bracket. The brackets are always aligned with the beginnings and ends of bars. In the text style window you can determine the font for the figure using the option »*Rep. Ending*«.

If you wish to edit the number or text, double-click on it or use the text cursor tool.

Of course, these brackets can be used for any text you want to bracket, not just numbered endings.

You can change the appearance of all the repeat ending brackets in a song with the global format parameter *Alternate Repeat Symbols* ("Re-al Book" view).

D.S., D.C., Coda, etc.

These are entered in the usual ways into the score. You may find the "sizer tool" from the Toolbox to be especially helpful in making them the size you find most readable.

EMAGIC

Trills, turn arounds, tremolos, rolls, etc.

These symbols may be placed freely anywhere in the score. The tremolo symbols can be placed on stems or above or below noteheads. All of these symbols can all be dragged left or right for different time positions. The vertical roll symbols, both with and without arrows, can be freely sized after placement, by dragging their endpoints up or down. You can also adjust their positions from the Event Parameter box, and trill lengths can also be edited from the Event List.

Manual (user) rests

The *individual rests* can be placed just like notes. Rests can even have a MIDI channel so that they will appear in the correct voice in a polyphonic score style. (The MIDI channel can be edited after the fact just like a note's MIDI channel, or it can be set in advance of entry as an Insert Default in the Event Parameter box.) The "velocity" of manual rests is used to determine vertical position on the staff. Manual rests can also be dragged up and down for positioning.

Manual rests interact with automatic rests, so that the correct number of beats per bar is maintained. Their appearance also depends on the *Syncopation* and *Interpretation* settings in the Display Parameter box. The default for manual rests from the partbox is *Force Syncopation* and *Defeat Interpretation*. This ensures that they appear with the value you have given them, and are not affected by the sequence's Interpretation and Syncopation settings. Manual rests can be resized with the Sizer tool, unlike automatic rests.
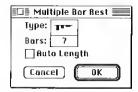
Multi Bar Rests

Multi Bar rests are used to avoid multiple bars of whole rests when a part has long periods of rest. The *multi bar rest* symbols are stored in the Partbox with the other rest symbols. Just drag one to the bar on the score where the multi-bar rest should begin. Alternatively, you can use the old-fashioned method of depicting rests — a combination of one-, two- and four-bar rest symbols (ecclesiastical rests).

To edit the rest, double-click directly on the rest symbol itself (not the number) and a dialog box (like the one shown below) will appear.

You can either set the length of the rest in bars, or check the *"Auto Length"* box, which automatically sizes the rest to last until the next

event, either in that sequence, or the next global event (like a time sig-
nature or bar line style change).

Even if the number is set to be very long, the rest still cannot last longer
than the next event, so it's impossible to inadvertently cover up any-
thing with an improperly edited *group rest*.

When viewing multiple parts, the multi-bar rest symbols will only be
displayed if each of the parts contains one of these symbols at the
same bar position. Furthermore, if one or more of those Multi Bar Rests
have a different value, then all of the Rests will take on the value of the
Rest with the smallest number of bars. In all other cases, they are re-
placed by the proper number of single empty bars.

Text, Lyrics, Chord Symbols

Read the section *Text and Text Styles* on page 12 - 64 for information
about designating fonts, sizes and styles to various types of common
text events.

For information about entering and editing Chord Symbols, see the
section *Transposable Chord Symbols* on page 12 - 72.

Tempo indicators

To use one of these graphic tempo indicators, just enter the note value
that gets the beat into the score in one of the usual ways, at the point
where you want the tempo change to be displayed. The symbol auto-
matically displays the tempo shown for that time in the global Tempo
List.

After these metronomic tempo indications have been inserted, they'll
automatically be updated whenever a new tempo setting is made in
the global Tempo List. Of course, you must manually insert a tempo in-
dicator in the score at every point where you want the tempo to be
shown in this way.

The font, size and style for the Tempo marking are set in the Text Styles window. For details, see the section *The Text Style Window* on page 12 - 69 and following.

12.4   Score Styles

LOGIC offers you different styles to use for your scores, just as it does for text. A Score Style is just a set of display characteristics that can be applied to one or more sequences. These characteristics include:

- Staff size, number of staves used for the sequence, and how they connect;
- Space above and below the staff;
- Basic clef (clef changes are still possible);
- Transposition of the notation (does not affect MIDI playback);
- Display of rests;
- Direction of stems, ties, tuplet symbols;
- Beaming style;
- Split point, or polyphonic voice assignment;

What Score Styles are NOT

Score Styles do *not* affect how you display an actual score consisting of several different sequences and tracks. Score Styles have nothing to do with score order, labels of staff lines in the score, page and bar numbers, etc. Score Styles are only used to control the factors listed above in the display of individual sequences.

To display a score of several tracks and sequences, you must use Instrument Sets (covered in the section *Instrument Sets* on page 12 - 56). While each sequence and/or track in the score can have its own Score Style, the job of putting them together, controlling score order, brackets and bar line styles is done with Instrument Sets.

Bar and page numbers are controlled in the Song Settings:Numbers/Names window, available on the Layout menu.

12

```
Bass
Piano
Treble
Treble+8
Treble-8
Alto Sax
Bariton Sax
Contrabass
Guitar
Guitar Mix
Horn in Eb
Horn in F
Organ 1+2/3+4/5
Organ 1+2/3/5
Organ 1/1/5
Organ 1/3+4/5
Organ 1/3/5
Piano 1+2/3
Piano 1+2/3+4
Piano 1/3
Piano 1/3+4
Piccolo
Soprano Sax
Tenor Sax
Trumpet in A
Trumpet in Bb
Viola
Violoncello
#Drums
**** DUPLICATE! **
```

Assigning a Style to a sequence

Select the staff or staves to which you want to assign a Score Style, and use the flip menu next to the word Style in the Display Parameters box.

LOGIC has many built in styles, shown here. You can edit them, duplicate them, or design your own styles using the Score Style window.

Making quick copies of an existing Score Style

The style name "*DUPLICATE*" at the bottom of this flip menu is the single fastest way to make a copy of a Score Style. It makes a copy of the current Score Style, which you can immediately edit (and rename) in the Score Style window, and assigns it to the selected staves. This is especially convenient when all you need to change is the space above a staff, since after making the "duplicate" style, you can immediately drag the staff by the clef sign to change the clearance above, without fear of affecting the original Score Style (see 'The Staff' on page 38 below).

Default Style for Instruments

In the Instrument Parameter box (Arrange window or Environment window), you can set the default Score Style for all new sequences of an Instrument. The setting is made from a flip-menu at the very bottom of the box.

The default Score Style has no effect on existing sequences, but it does allow new sequences to look correct when the Score window is first opened, without having to first select the correct Style.

Automatic Style selection
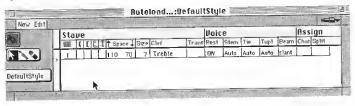
If you set the default Score Style for an Instrument to *Auto Style*, available at the very top of the flip-menu, LOGIC will assign either a treble, bass or piano staff style to new sequences, depending on the range of the notes that are in it. Since the Styles are searched in alphabetical order for the first Style of the correct clef type, you can define which one of each type will be found first. Just rename your three choices so that they'll appear at the top of the list, by adding a preceeding "Space" character at the beginning of each of their names.

Assigning a Style to all sequences of the same Instrument

Called "Global Style Exchange", if you choose a Style while holding the ⌥ key, the style assignment of all other sequences of the same instrument are changed to the chosen Style. The chosen instrument's default style is also changed. The same effect happens when you change an Instrument's Style default (in the Instrument Parameter box, see above) with ⌥ pressed.

The Score Style window

To open the Score Style window, just double-click the currently displayed Style name in the display parameter box. You can also open it from the Layout menu. You may have as many of these windows open as you like at the same time. .

There is a Key Command available for *Open Score Style Window*, which you can set in the Key Commands window.

Link mode and the Score Style window

Link mode is available for the Score Style window, too. Just click on the chain link icon to enable and disable it.

Link mode allows you to use the Score Style window as a form of parameter box for the currently selected staves. When it is enabled, selecting a staff automatically causes its Score Style parameters to be displayed in the Score Style window.

That makes it a good idea to arrange your windows so that you can see both the Score Style window and the Score window itself, so that you can see the Score Style parameters when select a staff, and instantly see the effect of any changes you make to the Score Style.

Selecting the Style to show in the Score Style window

You'll find the Style name/selector button below the Link button and Toolbox. Clicking and holding on it produces a flip-menu containing the available Styles. The default Styles (in the new song) are shown above.

Styles whose names show slashes between numbers are polyphonic. On these, individual voices are distributed according to their MIDI channel numbers (more on this below).

What is a Style element?

A Style is made of one or more elements. An element represents an independent *voice*.

What is a voice?

A *voice* is a group of settings that are applied to a "logical part". The idea is similar to voice parts in choral music, where there are often four voices (two assigned to each staff) even though only two staves may be used. The soprano and alto may have different stem directions, and may have independent rhythms, but are still likely to be displayed on a single treble staff. Each is a *voice*.

In LOGIC, a *voice* is determined in either of two ways:

- Pitch of the note. A split point between two voices determines which *voice* a note will fall into (set under *Split*).

- MIDI channel of the note. In LOGIC, the MIDI channel of the note on the Event List and in the Score window may be different than the playback MIDI channel determined by the Instrument on the Arrange window. This allows use of the MIDI channel to determine which *voice* a note will be displayed in, without affecting how it sounds when played back (set under *Chan*).

A *voice* also has its own settings for:

- Rests – whether automatic rests are ON or not.
- Stems – up, down, automatic or hidden (especially useful for slash noteheads in rhythm parts).
- Ties – up, down or automatic.
- Tuplet brackets – up, down or automatic.
- Beams – horizontal, slanted or vocal style (no beams).

In the Score Style window, these are all controlled using the flip menus that are accessible in the *Voice* area of the window, except for *Rests*, which are simply *ON* or *OFF* (blank).

A voice is not necessarily a single line. It can consist of either chords or lines, as long as all the notes are intended to share the same characteristics just described.

Voice assignment in two-voice styles

In two-voice Styles, the *voice* assignment itself will be determined by:

- *either Split* point – notes are assigned to a particular voice depending on whether they fall above or below this point; *or*
- polyphonic *MIDI channel* — every MIDI channel has one voice. If any voice is assigned a particular MIDI channel, the split point for this and the adjacent voice ceases to operate. If you

only assign one voice a MIDI channel, the notes on all other MIDI channels automatically end up in the adjacent voice.

Generally, the second method is preferable to the first, as it doesn't tie you down to a fixed split point all the time, but lets you change the assignment of single notes as and when they are added later. You can set a split point as a basis for your work by selecting **Options > Score Preferences >** *Auto Split Notes at* (see page 14 - 32), and then assign different MIDI channels to notes directly as you record. However, automatic MIDI channel assign only works if a polyphonic Score Style has already been assigned to the instrument concerned while recording.

If you find you've only assigned the polyphonic Score Style afterwards, you can rearrange the voice assignment manually to follow the automatic split point, by selecting **Functions > Note Events > Split to Channels**.

Voice **assignment in styles with more than two voices**

In circumstances where there are three or more voices in a Score Style, the following possibilities exist:

- A Split point between each adjacent pair of voices. For example, a three-voice Style could have three Split points (based on pitch, of course) to determine voice assignment.
- Complete polyphonic assignment, where the MIDI channel of each note determines its voice assignment.
- A combination of split point and polyphonic MIDI channel assignment, where some adjacent pairs are handled with Split points, and others by MIDI channel. For example, a three-voice Style could have a Split point to separate the top two voices, and still use MIDI channel assignment for the 3rd voice. In mixed cases like this, a polyphonic MIDI channel assignment always overrides a split point assignment. In other words, a note's MIDI channel will be considered before its pitch when determining voice assignment.
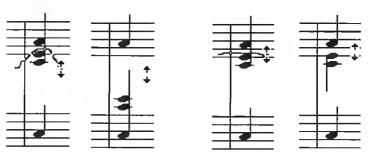
While it is possible to define many voices for a single staff, using »*Insert Voice*« from the Edit menu, it's usually best to limit yourself to two voices per staff, for readability's sake.

12

Changing the voice assignment for single notes

The MIDI channel of single notes (together with their voice assignment) can be changed at any time after recording, e.g. in the Event Float, or graphically with the Voice Splitter tool.

Whether you split the voices using this tool between staves (left) or within a stave (right), you spread the notes over voices within the same staff, or across different ones.

In other words, when you use the splitter within a staff, the notes are spread between the staff's highest voice and all the others. When you use the splitter between staves, the notes are split between the uppermost voice of the lower staff and the lowest voice of the upper staff (have some tea and read it again, if you like. It does make sense. Honest.).

The Staff

Each staff may have one or more voices assigned to it. The assignment of notes to voices in that staff will be determined either by split points or MIDI channel (polyphonic voice parts). Each staff includes these settings:

- Staff size, edited numerically
- How many staves (single or double) are used for the sequence – see instructions below for using the New and Edit menus to create and edit new styles, staves and voices
- How staves are bracketed and connected – graphically adjusted by dragging the mouse
- Space above and below staves, edited numerically (you can also simply grab the staff by the clef sign, and drag it up and down to change the clearance above it)

- Basic clef for each staff, chosen from a flip menu of clefs (clef changes are still possible in the sequence/staff itself)

- Transposition of the notation – edited numerically for each individual staff (doesn't affect MIDI playback)
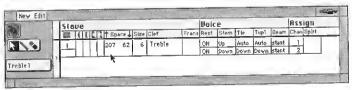
Sample Score Styles

A **standard single staff** consists of one staff with one voice. There is no

Staue								Uoice						Assign	
				Space	Size	Clef		Trans	Rest	Stem	Tie	Tupl	Beam	Chan	Split
t				110	70	7	Treble		ON	Auto	Auto	Auto	slant		

DefaultStyle

split point or polyphonic MIDI channel assignment, and no bracket or bar line settings are required. Automatic rests are enabled.
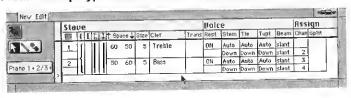
A **two-voice polyphonic single staff** style consists of two elements.

Staue								Uoice						Assign	
				Space	Size	Clef		Trans	Rest	Stem	Tie	Tupl	Beam	Chan	Split
I				207	62	6	Treble		ON	Up	Auto	Auto	slant	1	
									ON	Down	Down	Down	slant	2	

Treble 1

This one has a large amount of space above the staff, uses a treble clef, shows automatic rests for both voices, and uses opposing directions for stems, ties and tuplet brackets. Voice assignment will be as follows:

- Notes on MIDI channel 2 will be "alto" (stems down in treble clef)

- Notes on MIDI channel 1 will be "soprano" (stems up)

A **four-voice polyphonic two-staff** style consists of four elements.

Staue								Uoice						Assign	
				Space	Size	Clef		Trans	Rest	Stem	Tie	Tupl	Beam	Chan	Split
t				60	50	5	Treble		ON	Auto	Auto	Auto	slant		
										Down	Down	Down	slant	2	
2				50	60	5	Bass		ON	Auto	Auto	Auto	slant	3	
										Down	Down	Down	slant	4	

Piano 1+2/3+

Brackets and barlines are shown, each staff will have only one set of rests displayed, and the voice assignment will be as follows:

12

- Notes on MIDI channel *4* will be "bass" (stem down in bass clef)
- Notes on MIDI channel *3* will be "tenor" (automatic stems)
- Notes on MIDI channel *2* will be "alto" (stem down in treble clef)
- Notes on any other MIDI channel will be "soprano" (auto stems)

Every element in the Score Style window is represented by a separate line.

Additional hints on using polyphonic score styles

For polyphonic Score Styles, notes can be assigned to the proper polyphonic voice by setting their MIDI channels appropriately. This can be done by any of the following techniques:

- Recording the notes with the master MIDI controller set to the correct MIDI channel for the desired voice.
- Editing MIDI channel in the Event Parameter box.
- Editing MIDI channel in the Event List.
- Editing MIDI channel in the Floating Event window (available with a Key command, »Open Event Float...«).
- Using the polyphonic voice separator tool as described in the section *Graphic assignment of polyphonic voices* on page 12 - 50.

Remember that even though a *voice* may have its stem direction set to *auto*, you can still edit stem directions of individual notes using the Attributes menu, when necessary to avoid clashing with another polyphonic *voice* (see the section *Stems* on page 12 - 75 for details).

Creating a new Style

There are various ways of achieving a new Style, by choosing items in the Score's New menu and/or using the Score Style Toolbox:

- Duplicate Style makes a copy of the style currently being displayed.
- Single Stave Style creates a style with one staff.
- Dual Stave Style creates a style with two staves.
- Mapped Style creates a style where you can control the display position and style of individual pitches. This is used mostly for percussion and drum parts, and interacts with the Mapped Instrument type in the Environment window. As a unique type of Score Style, it's covered in detail under "Mapped Drum Notation" later in this section.

Logic

The single most useful style creation option is probably *Duplicate Style*. Since many styles are included already, it's likely that one of them is close to what you need, allowing you to simply duplicate it and edit the copy, instead of having to start from the very beginning.

Deleting a Style

Select the Style you want to delete and choose »*Delete Style*« from the Score Style window's Edit menu.

Naming a Style

To name a Style, double-click on the name field (where the pointer is shown here) and change it as you wish, then press Return.

Inserting Staves and Voices

To insert voices or staves into the current Style Definition (see below), you need to determine the insert point using the narrow selection column containing the little pointer which is at the left-hand end of the Style line. You position the insert pointer by clicking within the selection column. This function is similar to the Instrument Set window insertion pointer.

If you use the *pencil tool* to insert voices or staves, you don't need to set the insert point. See below.

Inserting a Voice

To create an additional voice on an existing staff, choose »*Insert Voice*« from the Edit menu. The voice will be inserted at the point determined by the pointer. Then you can edit the Split or Chan setting to allow you to distinguish the voices.

You can also insert a new voice by using the *pencil tool* from the Score Style window toolbox to click directly anywhere in the Voice parameters area, on the line between two voices. That will insert a copy of the upper voice line into the staff of the upper voice. Clikking under the last voice will add a voice to the last staff.

Insert Stave

To create an additional staff, choose »*Insert Stave*« from the Edit menu. The staff will be inserted at the point determined by the pointer. Of course, adding a staff will also add a new voice.

You can also insert a new staff by using the pencil tool to click directly anywhere in the Stave parameter area. A copy of the staff will be made at the click point.

Selecting Style elements

The narrow selection column at the lefthand end of an element line is also used to select one or more elements. You can drag out a selection marker in it to indicate which elements are selected. The following editing commands apply to these selected elements.

Score Style Window Display Options: Style List or Single Style

The Score Style window has two modes. One is designed for creating and editing individual styles. The other displays a list of all the styles in the current song, for ease in copying and pasting into other songs, to prevent duplication of effort.

Style List mode

To get into this mode, double-click on the open space below the last *voice* line, as shown here. Alternatively, click on the small box on the left-hand side of the menu list in the Score Style window.

You'll see a list of all the score styles currently defined in your song. Un-

Style	Type
Bass	normal
Piano	normal
Treble	normal
Treble+8	normal
Treble-8	normal
Alto Sax	normal
Bariton Sax	normal
Contrabass	normal
Guitar	normal
Guitar Mix	normal
Horn in Eb	normal
Horn in F	normal
Organ 1+2/3+4/5	normal
Organ 1+2/3/5	normal
Organ 1/1/5	normal
Organ 1/3+4/5	normal
Organ 1/3/5	normal
Piano 1+2/3	normal
Piano 1+2/3+4	normal
Piano 1/3	normal

less you've made your Score Style window unusually tall, you'll probably need to scroll it to see all the styles. To select a style for cut/copy/clear, just click on it once. To select several that are adjacent to each other, just drag the mouse over them. To select several that aren't adjacent to each other, just hold ⌥ and click on them.

The style type can be either normal or mapped, described later in this section.

To return to the single style display mode, just double-click on the style you'd like to see. Alternatively, you can close the list by clicking on the box in the menu line again.

Selecting Styles from the Score Style window

Selecting in List view

To select a Style for Cut, Copy, or Clear operations, click on one of them. You can select several Styles by 'rubber-banding' them (if they happen to be consecutive in the list), or select non-consecutive Styles by clicking on them while holding down the ⬙ key.

In the **Edit Menu** in List view (see following section) there are some other methods of selection:

Toggle Selection   swaps the selection (behaves as in other windows);

Select Used   selects only Styles used in the current song;

Select Unused   selects only Styles *not* used in the current song (to delete them, for example).

Selecting Style elements in Single view

With the aid of the narrow selection column in Single view, you can also select one or more Style elements, by 'rubber-banding' them.

Editing Score Styles from the Edit menu

The Score Style window's Edit menu contains standard Macintosh-style editing commands. The commands work on single styles, or on all styles you've selected in Style List mode.

- • »*Cut*« removes the selection from the Score Style window and places it in the clipboard. Keyboard shortcut ⌘Ⓧ.

- • »*Copy*« makes a duplicate of the selection and places it in the clipboard, leaving the original in place. Keyboard shortcut ⌘Ⓒ.

- • »*Paste*« is used after the above two commands, and inserts the contents of the clipboard back into the Score Style window. Keyboard shortcut ⌘Ⓥ.

To avoid confusion, be sure that the Score Style window is showing the same type of display that was there when you selected »Cut« or »Copy«, either the Style List, or the parameters for a single Style.
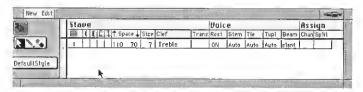
- If the clipboard contains a selection of styles, they'll be added to the list of styles available in the Score Style window.

- If the clipboard contains style elements, they'll be inserted in the current style, at the position determined by the insertion pointer.

- • »*Clear*« deletes the selection, or use ⌫. You can also use the *eraser tool*, to click on any line, and the entire current selection will be deleted.

- • »Select All« selects the entire contents displayed in the window. A short click in the rectangle above the selection column also selects all rows.

Style settings for staves

The following sections cover all the settings that relate to the display of staves within a Style. Within the Score Style window, the area we're discussing is covered by the caption »*Stave*«. The explanations follow the order of the columns, from left to right.

Making a voice use an existing staff
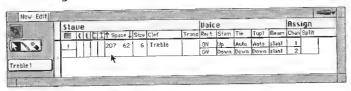
Each staff is numbered. When you want a voice to share a staff with another voice, simply click on the staff number of the additional voice. This assigns the voice to the same staff as the voice above it in the Score Style window.

If the staff is disabled, the other staff parameters disappear since they have no function.

You have two Style lines. The first is numbered, the second is not: this defines a single staff with two voices.

Stave brackets, end bar lines and connecting (dotted) bar lines

Styles that have at least two staves are able to bracket the staves to-gether, and/or connect their bar lines. To do this, click and drag the mouse beneath the desired type of bracket or bar line symbol. This ex-ample shows piano-style brackets, a left edge connecting bar line, and a mid-line connecting bar line.

If the Style is altered in such a way as to leave only one stave remaining, the program automatically deactivates the use of the brackets and con-nected bar lines.

Graphical Bar Line editing

The bar lines connecting staves can also be edited with the mouse di-rectly on the score, *when the score is in page edit or print view*. When you click on the upper corner of a bar line (where it meets the top of a staff), it will alternate between being connected or not connected to the staff above it. When this graphic method is used, the correspond-ing setting in the Score style is edited automatically.

Distance between staves

The »*Space*« parameter decides how much space the staff requires above or below the staff, e.g. for text and notes on leger lines. The lefthand value defines the space needed above, the righthand value, the space below. This example has considerable additional space above.

Graphic adjustment of vertical clearance above the staff is possible. Just grab the staff itself by the clef sign, and drag it up or down as you find necessary. This will change the number displayed for Space above the staff in the Score Style window.

It's easy to create a duplicate Score style from the flip menu in the Dis-play Parameter box (as described earlier in this section). When the only difference between old and copied Score styles is the space above the

staff, you can create the copy and graphically adjust the space above it without even needing to open the Score Style window, if you wish (see the section *Making quick copies of an existing Score Style* on page 12 - 34).

Setting the size of the printed staff

LOGIC's *»Size«* parameter allows you to adjust the size of the staff to one of ten different settings ready for printing out. Using this setting, you could combine, say, a normal stave with a miniature one.

Bear in mind that the *size* of the staves on the screen is in part influenced by the window's zoom factor. When choosing the required print-out size, it can make sense to maximize the zoom factor first, or do a test print.

Selecting the basic clef and number of lines

Clicking and holding on the *Clef* column produces a flip-menu containing a large number of basic clefs (shown here). The selection you make here affects the type of staff that appears. The built-in clef signs are shown here.

All sorts of staves are available, including one, five and eight-line ones. For instance, *»Drum 1«* produces a single-line stave for percussion instruments.

This is also where tabulature clefs are chosen that you've defined in the Song Settings:Guitar Tabulature window. Tabulature details can be found in the section *Song Settings* on page 14 - 1.

Transposition of the displayed staff

Each staff can have its own transposition *for notational purposes only* — this has no effect on MIDI playback. It is set using the *»Trans«* parameter, and edited numerically in half steps. Positive values transpose up, negative values down.

By a combination of an appropriate key and a suitable display, it's easy to set up styles for transposing brass instruments. The advantage of having styles like this is obvious: in the Score editor, you can run off transposed scores for brass rapidly, just by selecting one of the transposed styles!

A transposition setting affects notes and chord symbols (CHORD in the Partbox). It does *not* affect the vertical height of associated slurs, lyrics, etc. That means that if you edit the graphic details of a part in an un-

The list shown in the left margin:

Bass - 8
Bass
Treble
Treble+ 8
Treble-8
Bariton
Tenor
Alto
Mezzosop.
Soprano
Drum.0
Drum.1
Drum.2
Drum.3
Drum.4
Drum.5
Drum.6
Drum.7
Drum.8
no clef.0
no clef.1
no clef.2
no clef.3
no clef.4
no clef.5
no clef.6
no clef.7
no clef.8
TAB Guitar
TAB Guitar
TAB Guitar
TAB Guitar
TAB Guitar
TAB Guitar
TAB Guitar
TAB Bass E
TAB Bass C
TAB Bass B
TAB Bass C
TAB Bass B

transposed state, and then transpose it later, some of those details may need adjustment.

If you're using a transposing Score Style, then keys that normally require double 'b' or '#' accidentals are automatically shifted enharmonically.

For example: you have B major accidentals (5 crosses) and are using an alto saxophone Score Style, which transposes up nine semitones, and should therefore give G# major — with 3 more crosses. The result will be 8 crosses (6 crosses plus the F, with a double cross). Instead, LOGIC selects Ab major automatically — with 4 'b' accidentals.

Style settings for voices

The next section (entitled *Voice*) has settings for independent voices, regardless of whether they occupy a separate stave or form part of a multi-voice polyphony. Other than automatic rests, all the settings are made from flip menus that appear when the current setting is clicked/ held.

Voice		
Rest	Stem	Tie
ON	Auto	Auto
	Down	Down

Enabling/disabling automatic rest display

This parameter allows you to enable or disable the display of the rests that automatically appear wherever there aren't any notes. Disabling automatic rests can make sense when the voice is combined with others in one stave, and one of the other voices is already displaying all (or most) of the necessary rests. Remember that you can always add manual rests from the Partbox when necessary. When enabled, the »*Rest*« box shows »*ON*«. When disabled, it is blank. A single click changes it.

Stem direction

Each voice can have its own default stem direction (set using the *Stem* parameter), though an individual note can have its stem direction changed using the Attributes menu.

With staves that have just one voice, there's no need to worry about stem direction as the stem default is »*Auto*« (see below). Where a voice is sharing a stave with others, it's often necessary to give each voice its own stem direction. You have four options:

- *Auto:* the direction is automatically determined by the pitches of the notes and the position in the staff. This probably makes sense even for two voice polyphonic staves, if the second voice is only rarely used.

12

- *Up:* the stems are forced upwards.
- *Down:* the stems are forced downwards.
- *Hide:* the stems can be hidden.

Tie direction

Each voice can have its own default *Tie* direction, though an individual note can have its *tie* direction changed using the Attributes menu.

Voice		
Rest	Stem	Tie
ON	Auto	Auto
	Down	Down

With staves that have just one voice, there's no need to worry about tie direction as the tie default is »*Auto*« (see below). Where a voice is sharing a stave with others, it's often necessary to give each voice its own tie direction. You have four options:

- *Auto:* the direction is automatically determined by the pitches of the notes and the position in the staff. This probably makes sense even for two voice polyphonic staves, if the second voice is only rarely used.
- *Up:* the ties are forced upwards.
- *Down:* the ties are forced downwards.

Tuplet bracket direction

Each voice can have its own default tuplet bracket direction (set using the *Tupl* parameter), though an individual note can have its tuplet bracket direction changed using the Attributes menu.

Tupl	Beam
Auto	slant
Down	slant

With staves that have just one voice, there's no need to worry about tuplet bracket direction as the tuplet bracket default is »*Auto*« (see below). Where a voice is sharing a stave with others, it's often necessary to give each voice its own tuplet bracket direction. You have four options:

- *Auto:* the direction is automatically determined by the pitches of the notes and the position in the staff. This probably makes sense even for two-voice polyphonic staves, if the second voice is only rarely used.
- *Up:* the tuplet brackets are forced upwards.
- *Down:* the tuplet brackets are forced downwards.

Beam display

Each voice's beams (set using the *Beam* parameter) can be affected in one of three ways, though the beaming of individual notes can be changed with the Attributes menu:

- *Vocal:* the notes are displayed without beams. Each note has its corresponding flag.
- *Horiz.:* horizontal beams, as used in percussion notation.
- *Slant :* slanted beams of varying angles, as used in standard notation. The **Song Settings > Global Format** window also has settings that affect slanted beams.

Assigning notes to voices

Using the channel setting as a filter for the display

As described in the earlier section about polyphonic voices, each voice can be assigned a MIDI channel. This parameter can act as a display filter as well. If all voices are assigned a specific MIDI channel, then notes on other MIDI channels won't be displayed, even though they will still sound.

If there's no value set here for a particular voice: any notes not matching the MIDI channel of some other voice will be displayed in the voice with no setting. In this example, notes on channel *2* will form the second voice, and all other notes will go in the first voice.

Splitting voices by pitch«

If two adjacent voices in a Style have been given the same channel (or no channel setting), *»Split«* determines the pitch at which notes equal to or above the split are put in the upper voice, and those below, in the lower one. The setting shown will cause all notes from *C3* on up to go in the upper voice, and *B2* on down to go in the lower voice. (Remember, the voices can be in the same staff, or different ones.)

This is a "hard" split point, so that the split will occur whether it is musically sensible or not. If you need a "moveable" split point, you must use a polyphonic style.

A good example of »split« in action can be seen in the Style »Piano«, one of the default Score styles. It's a two-stave style divided by middle C (*C3*).

Defining a polyphonic Style

• Create a style with at least two voices.
• Assign each voice to a different MIDI channel.

Tip: make use of the default polyphonic Styles to experiment with the possibilities.

Manually entering and editing polyphonic notation
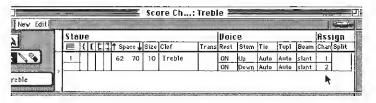
For manually entering polyphonic notation directly into the Score Editor, or editing it, you are given the special function *»Explode Polyphony«*. This function »explodes« a polyphonic staff into as many single staves as it has voices. This allows you to edit each voice separately without fear of affecting the others. When done, you simply reverse the function to combine the voices once again.

»Explode Polyphony« is covered in more detail in the section *Explode Polyphony* on page 12 - 6.

Graphic assignment of polyphonic voices

To divide a polyphonic part between the voices assigned in a polyphonic score style, use the polyphonic voice splitter tool. It allows you to draw temporary graphic lines between notes that should be in different voices of a polyphonic score style. The notes will immediately redraw to reflect their new voice assignments, including different stem directions, etc.

Here's an example of a polyphonic Score Style. Notes that are intended to be in the lower voice (stems down) are changed to MIDI channel *2* in order to take advantage of this Score Style.

Here is a polyphonic part using this Score Style, before adjustment.

Notice the starting position of the polyphonic voice tool in the lower left. This is how it looks after a line is drawn between the two basic voice parts with the polyphonic tool, now on the right.

.Here is the finished product, after the mouse button is released.

Notice that the stem directions and note values are now correct without further editing, because that is how they were defined in the Score Style above.

To separate just the notes of one chord into the proper voices, just click somewhere between the notes: you don't have to draw a line.

Mapped Drum Notation

You can now use LOGIC to create and manipulate Mapped Drum Notation. This means any note number (drum sample) can be graphically re-assigned to a specific line in a Drum clef and that each note number can have a pre-defined drum note head. This kind of Score Style works in combination with the Environment's »Mapped Instrument«.

Basic concept

Each note of a »Mapped Instrument« can be assigned to one of 64 user-definable »Drum Groups«. For example, there could be one »Drum Group« for snares, one for hi-hats and another one for all toms. »Drum Groups« are logical organizations of notes whose notation should be similar or related. Note heads and vertical positions can also be defined independently for each note.

To make a mapped Instrument's notes appear in a mapped drum score, you have to use a new class of Score Styles, the »Mapped Styles«. In a »Mapped Style«, notes are assigned to *Voices* by their »Drum Group« (instead of Split Points and/or MIDI channels as in the case of a Standard Score Style).

Other Style parameters like brackets, stave distance, direction of stems, ties, tuplets and so on are identical in mapped and standard Score Styles.

You can create virtually any number of mapped Instruments or mapped Styles and use them in any combination. The number of drum groups is limited to 64, and all mapped Instruments share the same 64. Changing the name of a particular drum group in a mapped Instrument will cause the name of that drum group to change in *all* mapped Instruments.

Sharing a mapped Style between different mapped Instruments

One reason for drum groups as an intermediate step between the actual drum notes and the mapped Score Style is that they allow you to use different drum machines with different drum maps, while still using the identical mapped Styles for both instruments. In other words, you can use the exact same notational setup for different drum maps, without doing duplicate setup work.

To do this, you would make a mapped Instrument (in the Environment window) for each of the drum machines, assigning related sounds to the same drum groups in each one. For example, the snares in each drum machine might be assigned to a drum group named "Snare", even though the snare sounds could be assigned to different notes in the different drum machines.

After having defined each drum machine's drum group assignments using the same drum groups, the drum groups are assigned in a mapped Style for complete control over where on the staff each drum group is scored. That means that a drum group's position in the mapped Style drum staff can be totally different than the pitch of a note that is assigned to that drum group in a mapped Instrument.

Using different mapped Styles for the same mapped Instrument

On the other hand, you can use different mapped Styles for different sequences that go to the same mapped Instrument. You might do this so you can have different notational styles for the same drum map, for different applications.
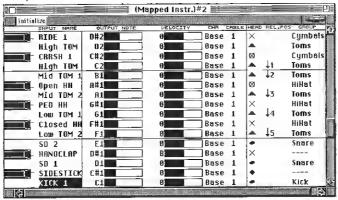
Mixing mapped and standard Instruments and Score Styles

If you choose a single or dual Score Style for sequences that go to a mapped Instrument, you will get a standard score displaying the sequence's input notes according to the actual Style parameters. A mapped Style assigned to a non-mapped Instrument sequence will result in an empty drum score.

How To Set Up the mapped Instrument's notation parameters

• In your Environment window select or create a mapped Instrument. (to create a mapped Instrument, use the »New« menu)

• Double-click on the mapped Instrument's icon to open the drum map editor.

• For each note, the following parameters can be edited:

HEAD   a flip menu (shown here) where you select the graphic note head for the note.

REL.POS   drag the mouse to adjust the position of the note head in the stave relative to the uppermost stave line. Integer values will make the note fall onto a line, whereas fractional values will make a note appear between two lines. The vertical note position is independent of the actual clef. You can drag up or down.

GROUP   a flip menu (part of one is shown here) where you select which drum group the note will be assigned to, i.e., Bass drums, Snares, Toms, etc. Notes that are not assigned to any drum group (»—« in the GROUP

column) will never appear in a mapped score. Since the drum groups are used for the voice assignment in a mapped Style, you should assign one drum group to each group of notes that you want to see together in one voice. To rename a drum group, double-click on the *GROUP* name.

For more details about mapped Instruments, see the chapter on the Environment window.

How to Set Up the mapped Score Style

Essentially, the process of defining a mapped Score Style is one of creating *voices* and assigning at least one drum group to each one. All the drum groups assigned to one *voice* will share the same stems and other settings, exactly like polyphonic voices in other Score Styles. You'll want to add as many *voices* to a staff as you want polyphonic voices to be displayed. Here's the basic process:

* Open a Score Style window.

* From the »New« menu choose Mapped Style.

* As a default, a one voice definition is created (remember, each *voice* can display one or more drum groups).

Stave									Voice							Assign
☰	(	[	[	[	⁑	↑	Space ↓	Size	Clef	Voice	Rest	Stem	Tie	Tupl	Beam	Pos	Drum Group
1							70	70	8	Drum.1	1	ON	Auto	Auto	Auto	horiz	Kick/Snare

* Choose the desired drum group for this voice in the Assign column, using the flip menu that appears when you click/hold on the current drum group name.

* Add any additional number of staves or voices, as you would do with a standard Score Style, by using the pencil tool to click the empty area at the bottom of the Style editor or choosing »Insert Voice« or »Insert Stave« from the »New« Menu. To force a drum group to be part of the *voice* above it in the Score Style window, just click on its *voice* number.

* The default staff position of a drum group is the top staff line. If you are using polyphony (several *voices* within one staff), you can use the mapped Style's *Pos* parameter to shift all notes of a drum
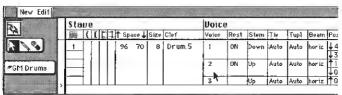
group to some other staff line. The *Pos* parameter works just like

REL.POS in the mapped Instrument editor. It shows the number of staff lines above or below the top line, with fractional values making display on spaces possible.

- Depending on your needs, you may want to disable rests for some voices. It's a good plan to arrange your Score window, Score Style window and mapped Instrument drum map editor so that as you work on your mapped Score Style and mapped Instrument, you can immediately see the effects of your editing on your music.

The mapped Score Style shown here, in combination with the mapped Instrument on the previous page, was used to produce this bar of drum music. Notice especially that the staff lines used to show the Toms (tri-

angle note heads) are affected both by the mapped Instrument's *REL.POS* and the mapped Style's *Pos*. See comments under "Tips and Tricks" below for some hints.

As you can see, the hi-hats, toms, crash cymbal and kick/snare each have unique note heads. Notice that a *voice* can contain more than one drum group, all sharing the same stems and other settings. (To switch the hi-hat back to its own voice, click where the pointer is shown in this mapped Score Style window.) The way the *Pos* is set is the same as in the mapped Instrument drum map editor.

- Re-name your »Mapped Style« to »Drum Style1« (say) by double-clicking onto the name field on the left of the Style editor.

- Close the Score Style window and re-assign this score style to the drum sequence (using the Display Parameter window) and/or set 'Drum Style 1' as the default Score Style in the mapped Instrument's parameter box.

Drum Notation Tips and Tricks

To achieve a single polyphonic drum staff that contains multiple groups (Bass drums, snares, hi-hat, etc...) make sure that only one staff in the mapped Style's staff list is set to »on«. Under these conditions »Explode Polyphony« (Score Structure Menu) will separate the single polyphonic staff into separate monophonic staves.

You may have noticed that there are two ways of defining the vertical position of the mapped notes: a note's »*REL.POS*« parameter in the Mapped Instrument and another »*Pos*« parameter in the mapped Style's voice. You can freely combine both parameters; their vertical displacements will be added up to get the final note position. Although you could create any desired vertical positioning just by using the mapped Instrument's individual »*REL.POS*« parameters, obeying the following rules will give you the best compatibility between several mapped Instruments and several mapped Styles:

- Use the mapped Instrument's individual note-by-note »*REL.POS*« parameter to define relative displacements between different notes within one drum group. For each drum group, one of the notes (perhaps the most frequent one) should be left without displacement.

- Use the mapped Style's voice-»*Pos*« parameter to define the vertical displacement between different voices (drum groups) within one stave.

12.5   Instrument Sets

Instrument Sets can be used to filter score data for certain groups of instruments out of a complete song without having to put them into a separate folder. These sets allow you to define stave names independently of instrument names, as well as abbreviated names. In addition, you can define brackets or bar lines to connect staves for different instruments. The order in which the instruments appear in the score is the same as in the Instrument set, so you don't have to change the

track list in the Arrange window to get the order of staves in the score you want.

If you simply want to see all staves for all Instruments in the order of the arrange tracks, you can choose the »ALL INSTS.« default set. In this case, an overall »bracket« and connected bar lines are automatically added.

Instrument sets determine only the contents of the score display when the Arrange level being shown is higher than a single sequence. Be sure you understand how to determine what Arrange level you're seeing, how to change Arrange levels in the Score window, and how Explode Folders works before going on.

Say you only want to see the bass and piano parts of a piece, and they're spread around several different sequences, perhaps even in different folders. From the Score window, find an Arrange level that displays both the bass and piano staves; if they're in separate folders, you'll need to Explode Folders (function in the View menu). Select the staves that contain the piano part and the bass part (just one of each is enough). On the Layout menu, choose »Create Instrument Set from Selection«. A new Instrument set will be created to display both bass and piano parts, and will automatically be assigned to the current Score window. In order to see the entire piano and bass part, you may need to move up one or more levels in the arrangement. Later in this section you'll learn how to edit the stave names, brackets, etc.

The different levels of sequences and folders are still active. If you now choose Explode Folders (View menu) and go to the highest level by double-clicking on the score background, you will see the piano score of the whole song, no matter how many piano sequences you have in various folders on different levels.

12

NB: Display of Muted Sequences

Muted sequences are displayed only at the very lowest level of the arrangement. The only way to view a muted sequence is to double-click on it directly, opening a Score window that displays it.

Basic Functions and Properties of Instrument Sets

- The default Instrument set is ALL INSTS. It simply displays every Instrument for which there is a sequence recorded, from the current Arrange level on down.

- *Instrument sets are only active* when you're at an arrange level above a single sequence.

- *Instrument sets* are part of a song. You may want to add some to your AUTOLOAD song to prevent duplicating your work for commonly used Instrument sets.

- To change to another Instrument set, click and hold on the currently selected Instrument set. Its name is shown just below the "catch" and "link" icons. In the example below, the current Instrument set is *ALL INSTS.*

  When you click and hold on the current Instrument set's name, a flip menu appears, showing you the names of other instrument sets that have already been defined. To select a different Instrument set, keep holding the mouse button down, drag the mouse until the one you want is highlighted, and release the mouse button. Of course, if the song you're using has no other Instrument Sets defined, you won't see any more here, either.

  You'll immediately see the new Instrument set in the Score window, provided:

- You were looking at a level that includes the required sequences when *ALL INSTS.* was selected (you can always change level); and

- You've actually recorded sequences in tracks assigned to the instruments that your new Instrument set will display.

Several Score windows can show the same song using different Instrument Sets. This allows you to edit a full score and a partial score simultaneously, in different Score windows.

Instrument filter
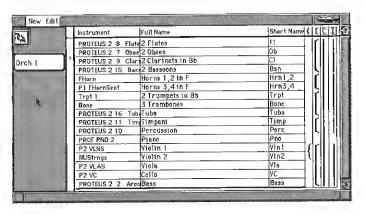
When you click and hold onto the Instrument set flip menu (where you normally see »*ALL INSTS.*«) while holding down ⌨,you will see a menu displaying all instruments that have a track in the Arrange window. After choosing one you will see only the sequences of this specific instrument displayed in the score window. This creates a sort of temporary Instrument set.

Please keep in mind that you can always print out the contents of the active score window.

Logic

Creating and Editing Instrument Sets

- To modify an existing Instrument set you need to open the Instrument Set window from the Layout menu (you can also open it by double-clicking on the current Instrument Set name).

- There is a key command available for *Open Instrument Set Window*, which you can set in the key commands window.

- You can also create a new Instrument set using this window, though simpler and faster ways are described shortly in following sections.

- Following is an example of the Instrument set window, with the full score for an orchestra defined.

Instrument	Full Name	Short Name
PROTEUS 2 8 Flute	2 Flutes	Fl
PROTEUS 2 7 Oboe	2 Oboes	Ob
PROTEUS 2 9 Clar	2 Clarinets in Bb	Cl
PROTEUS 2 15 Bass	2 Bassoons	Bsn
FHorn	Horns 1,2 in F	Hrn1,2
P1 FHornSect	Horns 3,4 in F	Hrn3,4
Trpt 1	2 Trumpets in Bb	Trpt
Bone	3 Trombones	Bone
PROTEUS 2 16 Tub	Tuba	Tuba
PROTEUS 2 11 Tim	Timpani	Timp
PROTEUS 2 10	Percussion	Perc
PROF PNO 2	Piano	Pno
P2 VLNS	Violin 1	Vln1
NUStrngs	Violin 2	Vln2
P2 VLAS	Viola	Vla
P2 VC	Cello	VC
PROTEUS 2 2 Arco	Bass	Bass

- The name of the Instrument set (Orch 1) can be changed by clicking on it and entering the change.

- The *Full Names* are used for the first staff of the score, and need not be the same as the name of the Instrument itself. The *Short Names* are used for subsequent staves. Names are edited by clicking on them, and typing in the changes. Score names are also affected by the settings of the *»Numbers/Names«* window, available on the Layout menu of the Score window.

- Notice the bracket and bar line connections shown graphically on the right. These can be changed by simply clicking and dragging in the space where you want the connections to be, similar to the way Score Styles are handled. In this case, the piano part will have a normal piano bracket, because it was already assigned in the piano »Score Style«. In other words, brackets and bar lines from both Score Styles and Instrument Sets are active simultaneously.

12

Graphical Bar Line editing

The bar lines connecting staves can also be edited with the mouse directly on the score, when the score is in Page edit or Print view. When you click on the upper corner of a bar line (where it meets the top of a staff), it will alternate between being connected or not connected to the staff above it. When this graphic method is used, the corresponding setting in the Score Style is edited automatically.

The narrow column to the left of the Instrument names is used to select Instruments for editing with the Edit menu. Clicking and/or dragging the mouse in the column selects the instruments next to it (a solid line fills the column for selected instruments). Selected Instruments can be cut, copied or cleared using the Edit menu, and deleted with the ⌫ key on the computer keyboard. A short click in the rectangle above the selection column also selects all rows.

An "arrow" in the Instrument selection column shows where "New" instruments will be added to an existing Instrument set, and where "cut" or "copied" instruments will be pasted into the list. This example shows that an Instrument could be pasted in above F Horn in the score order. Just click in the selection column between two instruments to move the arrow.

The actual Instrument whose sequences will be displayed can be changed with a flip menu on the Instrument name itself, exactly as Instruments are selected for individual tracks in the Arrange window. If you've changed the *Full Name* of an Instrument to something other than the Instrument name, that name is kept even when the Instrument itself is changed via flip menu. That means you can keep the same Instrument set, labels and all, and simply change the Instrument that actually plays the part. Of course, this Instrument should be the same as the Instrument that's assigned in the Arrange window to actually play the sequence.

Creating New Sets from the Score Window — Fast!

- In the Score window, select the desired staves you wish to include in the new Instrument set. You may need to select *ALL INSTS.*, change arrange levels and/or use *Explode Folders* to get the staves you need in view. Remember, you can select non-contiguous staves using ⇧.

- From the Layout Menu choose »*Create Instrument Set from Selection*«. That's it!

There is also a key command available for this same function, called *Selection To New Instrument Set*, which you can set in the Key Commands window.

Tips

If an Instrument set already exists containing the same instruments that you select, LOGIC automatically selects this set. For example, if you have already created a Piano/Bass set, holding ⬆ and selecting the Piano and Bass stave and choosing »*Create Instrument Set from Selection*« will switch to that set. That means you can use this option freely, without fear of creating duplicate Instrument sets.

At this point, you can safely edit the new Instrument set so that it displays the staff names, brackets and bar line system you want.

There is a key command available for »*Create Instrument Set from Selection*«.

Creating New Sets from the Arrange Window — Fast!

In the Arrange window, select some (not necessarily all) sequences that you want to be in a score view. Now enter the Score window, either via **Windows > Open Score** (⌘⌥), or via the keyboard.

If your goal is to create a new Instrument set for the selected sequences, do NOT enter the score window by double-clicking on a sequence object.

Important

In the Score window, you may need to move up one level in the arrangement in order to see the score. You'll be seeing staff systems for the Instruments whose sequences you selected in the Arrange window before entering the Score window. The Instrument set name that is displayed will be a combination of those Instruments' names.

At this point, you can safely edit the new Instrument set so that it displays the staff names, brackets and bar line staff you want.

12

The Instrument Set Window Menus

Adding a new Instrument

To add a new instrument to the current Instrument set, at any point in the score order, click in the selection column to place the insertion arrow (try to click "between" instruments), and then select *Add Instru-*

New Edit
Duplicate Set
New Empty Set
New Complete Set
New Set of selected Ins

Add Instrument Entry

Delete Set

ment Entry from the New menu in the window. Then edit it as described above.

• A fast way to add some Instrument entries to a set is to double-click in the space below the last Instrument entry, then edit as desired. Of course, these entries will appear at the bottom of the score order, so this method is far less flexible than *Add Instrument Entry.*

Full Name, Short Name, and new instrument entries

New entries always use the Instrument name for the *Full Name*, and have no *Short Name.* When you click on the *Full Name* to change it, the text box will show ⊛(reference), which simply means the *Full Name* is the same as the Instrument name. If you type something in now, the new name will be used. As mentioned before, a name you've entered for the *Full Name* remains, even when the Instrument itself is changed for that line in the Instrument Set.

The New menu also allows you to create brand new Instrument sets.

• *Duplicate Set* – creates a new set based on the currently displayed set, and adds the word "copied" to its name. Then you can edit it as needed, give it a new name, etc.

• *New Empty Set* – creates a new set with no instrument entries, which you can use to build a new set, or paste in entries from another set.

• *New Complete Set* – creates a new set using all the instruments that appear in the Arrange window, even in different folders.

• *New Set of selected Inst.* – creates a new set based on selected Environment Objects

To delete the Instrument set currently showing in the Instrument Set window, choose *Delete Set.* Of course, this deletes only the Instrument set itself, not the sequences displayed by it.

The Edit Menu

The standard *cut, copy, clear, paste* and *select all* options are available here. These options are chiefly useful for:

- deleting sections of existing Instrument sets,
- copying portions of one set to another, and
- rearranging the score order of an existing set.

- *Select All* will highlight all Instruments of the current set (as shown in the selection column), and will typically be followed by *cut*, *copy*, *clear* or the ⌫ key.

- *Cut, copy* and *clear* will only operate when one or more Instruments is selected in the current Instrument set. Selection is normally made by clicking and dragging in the »selection column«.

- *Paste* copies whatever was most recently *cut* or *copied* at the current location of the selection arrow.

IMPORTANT NOTE!

Remember, any changes you make to an instrument set will not affect the displayed contents of the score window until you have selected that instrument set from the Instrument Set flip menu in the score window, and unless the current arrange level contains the actual sequences whose notation you want to see.

LINK and the Instrument Set Window

- When the "single click" link mode is enabled, the Instrument set window always displays the Instrument set that is currently selected in the Score window.

12.6 Text and Text Styles

Text entry and editing

The simplest way to add text is to use the partbox (click on the capital A in the partbox, then select TEXT), and click on the right part of the score with the *pencil* tool (the text will be entered in the most recently used »Text Style«, which defines the font, size, face, etc. More on this in a moment). Just click the *pencil* tool where you want the text to go, and type. You'll see it appear as you type. When you're finished with a particular entry, press ⏎, or click outside the text field. Practice it now by typing something in that has two or three words, but make a mistake (so you can practice editing), and don't press ⏎ until you've read the next paragraph.

Normal text editing functions are active as you work, including delete (⌫). You can also cursor back and forth, block sections to be replaced, and so on, till the entry is correct, as long as you do it before you press ⏎. Now, repair the mistake you made in your practice text, then press ⏎.

To *edit* an existing text entry (after it's already been entered), just double-click on it with the pointer, or click it with the text tool. The usual computer text editing conventions apply. The arrow keys are active for cursor movement. When you're done editing, press ⏎.

Fonts, size, italics, bold, alignment, etc.

You can change the *font* of a text entry to any font you have installed in your system, using the Text menu in the Score window. Just select the text entry(s) you want to change, and then select the correct font from the Font submenu. The basic system fonts are always available, plus any others you've installed, including Postscript fonts, Truetype fonts, etc. LOGIC is compatible with Adobe Type Manager.

The *size, face* and *alignment* of your text can be edited using the corresponding submenus of the Text menu. Just select the text entry (or entries) you want to change, and then select the correct point size, italics, bold, plain text, left/right placement, etc.

When a text (or lyric) item is selected in the score, you can also edit it in the Event Parameter box. You can numerically edit the size and position, and flip menus are available for style, font and alignment.

Logic

Editing text directly on the staff

You can move text about, copy it etc. on the staff, and get the postion-
ing right when you have several staves on-screen.

Lyrics

Lyrics are normal text events in every way, with one exception. They're
automatically centered on notes that occur at the same point in musi-
cal time, and they cause the music to space itself to make room for the
lyrics.

To type in lyrics and see them space automatically as you work, select
LYRIC from the Partbox. Then, click with the *pencil* tool above or below
the first note you want to attach a lyric to. Type the word or syllable *but
don't press* ⏎. Instead, press the tab key, ⇥. The music will adjust to fit
the size of the word or syllable, and position itself at the next point
where a lyric entry is possible (usually the next note). Type the next
word or syllable, press ⇥ and so on, till you've typed the last lyric in
that group. Then, to end lyric input, press ⏎.

As you enter lyrics, each individual entry can be edited before pressing
⇥. After lyrics have been entered, you can edit them in all the same
ways as text. The music will automatically reposition itself to fit your ed-
its.

Lyrics under tied notes

⇥ usually treats tied notes as a single note. However, if you wish to add
syllables to individual tied notes, you can move to the next tied note by
hitting ⇧⇥.

Automatic Text Objects

To enter an automatic text object, select the type you want from the
partbox, then click on the place you want it to appear in the score with
the pencil tool.

DATE:	current date. The format follows whatever you've set up in the control panel "Date & Time".
INST:	name of the current Instrument or Instrument set.
SEQ:	name of the currently displayed sequence (or folder).
SONG:	name of the currently active song.

These text objects change automatically when the object they relate to alter. For example, if you rename a sequence, the SEQ object changes to reflect this immediately.

If you edit the displayed text, the object converts to a standard text object.

The automatic text objects can be moved just like ordinary text objects, and have their size or appearance altered (either by means of Text Styles or by changing the assigned font directly). The only difference is that they cannot be used as lyrics.

The main use for the automatic text objects is for the creation of titles or footnotes, whose content will always be correct for the score currently displayed.

Global Text Objects

As an alternative to text objects that are tied to a particular staff or bar, and which are always part of a particular sequence, LOGIC also offers so-called »global text objects«, which are tied to a particular page.

You can use the following types of text object globally:

TEXT, SONG, SEQ, INST, DATE.

The global text objects can be inserted in the following positions on the page:

TOP MARGIN	the area over the top margin line;
HEADER	the area between the top margin line and the header line on page 1;
FOOTER	the area below the lower margin line;
SIDE	the left or right margin of a page, irrespective of the text object's ALIGN setting.

To create a global text object, you just insert the desired object at the position you want. Use the text cursor or drag the symbol out of the partbox to the right place. When the symbol reaches one of the margin areas mentioned above, LOGIC automatically inserts it as a global object.

You can determine which pages any global text object will appear on from its parameter box:

ALL	on every page;
1	only on page 1;

2...   on every pages *apart from* page 1;

DDD   on every odd page (1,3,5,7...);

EVEN   on every even page (2,4,6,8...).

All the usual parameters (text style, fonts, text attributes, size and orientation apply equally to global text objects.

The new automatic text objects (SONG, SEQ, INST, DATE.) are particularly well suited to being used as global text objects.

Here are some examples:

To place a copyright symbol at the foot of every page, just insert a global text object. Click below the lower margin with the text tool, type in the symbol and some appropriate text, and it's as simple as that!

You can use global SONG, SEQ, INST and DATE objects to help you distinguish between different versions of a printout.

You can create a title page by adding a global text object to the title area on page 1. If you've given your song the same name as the LOGIC song file, you simply need to pull a song object into the title area, and choose an appropriate text style (or create one). If you want a title different from the one you gave the song file, just type it in with the text tool.

To print a short song name on every page except the first one, insert another SONG object in the upper margin, and set the page parameter to "2...", to avoid getting the name twice on the first page.

The Text object parameter box

Text events allow the editing of staff assignment (for multiple staff Score Styles) and vertical and horizontal position. Staves are numbered from the top down for each individual score style, with the highest staff counted as "*1*". Vertical and horizontal position are measured from a "zero" position at the actual musical time of the event.

Fine-tuning the position of events

The best way is to use the mouse to get text events as close as possible to the ideal grid location without making large changes to the horizontal position parameter. *Then* fine-tune the events with the **vert.pos** and **hor.pos** parameters (in the Event Parameter box) .

Remember: the displayed location of an event on the page depends heavily on the actual bar and beat in which the event occurs. Avoid us-

ing the hor.pos parameter to move an event out of the bar in which its time position occurs. Doing so may mean that text is displayed on the wrong line in page mode, and may result in incorrect printing.

Other text parameters

In addition, *text events* have several other settings.

- The text can be a lyric (with auto spacing on the notes or musical time) or a regular text.
- Any defined text *style* can be selected from a flip menu. (Just click and hold on the *style* name.)
- The *align*ment of the text relative to its musical position can be altered. The symbols for *olign*ment mean, from top to bottom: left justified, centered or right justified *on the event time*, or left margin justified, centered or right margin justified *on the page*.
- *Size* can be numerically edited, in points.
- *Font* can be changed, using a flip menu (just click and hold on the font name).

Introduction to Text Styles

Up to now, the only font control we've discussed is an edit after the text or lyric has been entered. Of course, it's more efficient to define the font, size and style of text or lyrics *before* they're entered. In fact, you can predefine as many "templates" for text display as you wish, and retrieve them at any time either for new text entry, or to change a previously entered text item.

Text Styles allow you to define as many different text formats as you like. A Text Style contains the following parameters: *font* (Times, Helvetica, etc.), *size* (in points) and the *attributes* **bold**, underline, *italic*, outline and boxed .

The Macintosh version of LOGIC also offers the 'circled' attribute, displayed as a © . This is similar to "boxed", but there is a circle around the text, not a rectangle. For wide text, an ellipse is used.

You can define as many Text Styles as you wish. Then you can assign a Text Style you've defined to a selection of text events that have already been entered into the score, or choose one as an »*Insert Default*« , so that new text is entered in the Text Style of your choice.

With the selection functions you'll find in the edit menu, you can change the text layout of a whole song very easily. We strongly recommend using Text Styles instead of assigning fonts, sizes or effects
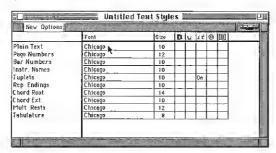
directly to individual text events, because it makes it much easier to carry out global changes for a certain group of text events without having to select them one by one.

The Text Style Window

To enter the Text Styles window you can:

- Select *Text Styles* from the Text menu.

- Double-click on the current *Text* style name in the Event Parameter box (it's visible when you've just selected a text event, or when the Event Parameter box is set to »*Insert Defaults*«). Here the current Text style is *Plain Text.*.

▽Insert Defaults	
Channel	1
Velocity	66
Text	Plain Text
Lyric	

Untitled Text Styles							
New Options							
	Font	Size	B	U	i	ⓞ	Ⓑ
Plain Text	Chicago	10					
Page Numbers	Chicago	12					
Bar Numbers	Chicago	10					
Instr. Names	Chicago	10					
Tuplets	Chicago	10			On		
Rep Endings	Chicago	10					
Chord Root	Chicago	14					
Chord Ext.	Chicago	10					
Mult Rests	Chicago	12					
Tabulature	Chicago	8					

There are ten »default« or built-in text styles, listed on the left of the window here. These System Text Styles can be edited and assigned similarly to user-defined Text Styles, but cannot be renamed.

Editing Text Styles:

- You can change the *Font* from a flip menu showing all the fonts installed in your system (just click and hold on the font name to get the flip menu). If you hold ⌥ while changing the *Font,* all Text Styles that used the same original font will also be reassigned. This is called global font replacement.

- You can change the *Size* numerically.

- By clicking in the appropriate box, you can turn on or off the following style characteristics: **bold**, underline, *italic*, outline and boxed .

The built-in styles are initialized with the most common system font. You can edit them to your preference, though they cannot be renamed. You can also add new text styles, by:

12

- Double-clicking just under the lowest entry in the list, where the mouse pointer is shown in the preceding example, or

- Selecting *New Text Style* from the New menu.

To name the new style, double-click on the name, and type in the name you want. The rest of the new font can be edited as just described.

Here's an example of some additions, and some alterations to the original text styles. This Text Style window has been zoomed with the telescope icon to a larger size.

New Options	Font	Size	B	u	i t	◎	B
Plain Text	Times	10					
Page Numbers	Times	12					
Bar Numbers	Helvetica	10					
Instr. Names	Helvetica	10					
Tuplets	Times	10					
Rep. Endings	Times	10					
Chord Root	Helvetica	12					
Chord Ext.	Helvetica	10					
Mult. Rests	Helvetica	12					
Tabulature	Helvetica	12					
Tempo Symbols	Chicago	10					
Titles	Times	32	On	On			
Italic 10 Times	Times	10			On		
Lyric 1/10	Times	10					
Lyric 2/10	Times	10					
Lyric 3/10	Times	10					
Boxed	Times	12					On
Sonata	Sonata	24					
Underlined	Helvetica	12		On			
Chord/Lyric	Helvetica	12					

Notice the *Sonata* Text Style. If you have the Sonata music font from ADOBE Systems, you can use its symbols as "text" events, without having to use the Sonata font for the music itself, in order to provide any unusual symbols you may need.

Text Fonts

When you load a song that uses fonts which are not available on your computer, the program will alert you about this by a simple message before loading the song. In the Text Style window, the font names will be displayed in brackets, so that you can easily redefine the text styles. Simply change the *Font* to one in your system using the flip menu. Global font replacement may be very helpful here.

If you use a font chosen from the **Text > Font** submenu, without creating a Text Style for it, this font can be displayed in the Text Style window by selecting »*Show Font References*« on the Options menu. Then

all used fonts will be displayed in the Text Style window, so you can redefine them globally. You can delete unused font references as well, by selecting »*Delete Unused References*« on the Options menu.

Font References

To select a Font, you should usually define a Text Style that contains all necessary font, size and face information. That gives you the most control and editing flexibility. You can, however, override the settings made in the Text Style for any selection of text events. If you do this, LOGIC generates a »*Font Reference*« that can be seen in the lower section of the text style window (only if the option »*Show Font References*« is activated).

- if you do change a font reference, all events that have been set to this font will change accordingly. The main use for this function is to offer a global font exchange when you load a document that uses fonts not available in ›your‹ system. You can't edit the *Size* or attributes of a font reference. All you can change is what the *Font* itself is.

- Fonts that are not available are shown in brackets. If you get the message »Some Text Fonts are missing...« while loading a Song you should open the Text Style Window, enable »*Show Font References*« and substitute all fonts in brackets with existing fonts in your system.

- »*Delete Unused References*« scans all text events in a whole song and, as you might guess, deletes all font references that aren't used anymore. It is performed automatically if a song is loaded and some font references cannot be resolved due to missing fonts.

- Don't forget that global font replacement may be very helpful in handling many font references at once.

Remember that you can make your Text Styles a part of your AUTOLOAD song, so that they're always available without duplicating your efforts.

12

12.7   Special Notation Symbols

Transposable Chord Symbols

$B^\flat{}^{13}_{/G}\,maj9$

Chord symbols are a type of text event. Each symbol has a root, two available lines of numbers/text and an optional different bass note. They are fully transposable if the sequence that holds them is transposed, or if the Score Style is transposed. Their vertical and horizontal positions can be adjusted (without changing their musical times) using the Event Parameter box, if necessary.

Entering Chord Symbols

You can enter the CHORD selection from the partbox into the score in all the usual ways. Also, you can hold 🔲 and click with the Text cursor tool I in the score.

Chord symbols are similar to lyrics in that you can press 🔲, and the cursor will move to the next rhythm location with a musical event in it that can serve as the anchor for the next chord symbol. After entering a string of chord symbols in this way, press 🔲 to end entry.

LOGIC tries to make sense out of whatever chord symbol you may type, but since there is no real standardization for these symbols, it may not always do what you want without editing on your part. To do as much as possible to control how the chord symbols are displayed before you edit them, here's how to enter them.

How to enter chord symbols

- Select the text tool from the toolbox in the score editor.
- Hold down the 🔲 key, and set the cursor to the position you want on the staff (the exact position will be shown on the info line).
- Type the root, using lower case "*b*" for flat, and "*#*" for sharp.
- Type the quality and/or numerical part of the chord symbol, using a comma *before* any part that you want to go to the top line.
- If you need a different bass note than the root, type a slash followed by the bass note, using lower case "*b*" for flat, and "*#*" for sharp.
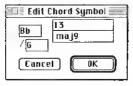
For example, to produce the chord symbol shown above, you would type exactly the following string, then press 🔲 to move on to the next Chord Symbol, or Return to end:

Bbmaj9,13/G

Editing an existing Chord Symbol

First select and then double-click on the root. You'll see this dialog box, and can type in any changes by clicking on each field.

The upper and lower chord extensions can also be edited directly in the score with the text tool.

- *Chord symbols can be freely positioned* anywhere on the score after entry has occurred, by dragging, though this also changes musical time position. Positions can also be edited in the Event Parameter box without changing musical time position.

- *To copy chord symbols,* just drag them to other locations in the score whilst holding down ⌘.

To change the text font used for chord symbols, use the Text Styles window. There you can change the font, size and style for the root (also used for the bass note) and the upper and lower extensions.

Automatic "Beat Slashes"

When you print lead sheets, LOGIC can automatically fill any empty spaces with beat slashes. Slashes can also be used as an alternative way of depicting ostinatos.

Here's how

Beat slashes are controlled by the *REST* setting in the Score Style window. You can use this parameter to choose between the *Hide, Show* and *Slash* settings.

If you pick *Slash,* all empty beats are shown as slashes instead of rests, irrespective of the current time signature.

Any beats containing notes or manual rests continue to be shown in standard notation.

This option allows you to create printouts where the first repeat of an ostinato is shown scored in full, while further repeats are just shown as slashes. To replace unwanted beat slashes with rests, you can just enter rests manually.
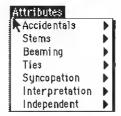
The preset standard song has a Score Style called *Lead Sheet* that uses beat slashes.

12.8 Note Attributes

LOGIC offers various functions for changing the look of individual notes or selected groups of notes. In general, individual note attributes should not be changed before the Score Style or Sequence parameters have been finally set.

Note Attributes Menu and Key Commands
The Score window´s **Attributes Menu** has various submenus, each

containing one group of note attribute functions. All these functions affect all selected notes when applied. These options are also all available as keyboard commands, which you can set to your preferences for keyboard shortcuts using the Key Command window.

Note Attibutes Dialog
Double-clicking on a note head with the arrow tool opens a dialog where you can inspect and set all attributes of *a single note* at the same time.

Logic

The **Reset** button will set all attributes to their neutral value.

Accidentals

Default Accidental
Enharmonic Shift: #
Enharmonic Shift: b
Force Accidental
Hide Accidental
Guide Accidental

- *Default Accidental* undoes the effect of any other option you may have taken on this menu.
- *Enharmonic Shift* allows notes to be expressed in different chromatic terms for ease of reading and correctness. For example, to change "Bb" to "A#", select the "Bb" and choose *Enharmonic Shift:#*. These settings interact with the key signature.
- *Flats to Sharps* and *Sharps to Flats* function in a similar way to Enharmonic Shift, but only on notes with accidentals. This makes handling whole chords easier, as notes with no accidentals remain unchanged .
- *Force Accidental* and *Guide Accidental* both put in the appropriate accidental for any selected note, even though it may not be required by the normal rules for accidentals. *Guide Accidental* puts the accidental in parenthesis, and is most useful for "reminder accidentals".
- *Hide Accidental* suppresses the display of automatic accidentals. Of course, this means that when this function is on, you can no longer guarantee that the note that sounds and the note that appears on the score will be the same.
- *Accidental Position* (only available in the attributes dialog) controls the horizontal distance between accidentals and note heads..

Global enharmonic shifting

In combination with the special selection commands, specific notes can be processed throughout the entire score, no matter what their octave.

Example: You want all »Db« notes to be displayed as »C#« throughout the score:

- Select any »Db« in any octave. Ensure no other note is selected.
- Choose *Select similar Objects* from the Score's **Edit** menu. This selects all the »Db's« in the sequence.
- Then choose *Enharmonic Shift: #*. All the notes selected will be displayed enharmonically shifted.

Stems

Default
Up
Down
Hide

- *Default* uses normal rules regarding position of notes in the staff.
- *Up* and *Down* change the selected note(s), and any notes that are beamed to it/them, even if they are not all selected.

12

- *Hide* removes stems. This is chiefly useful for rhythm parts that use slash-style note heads purely as "time/space" keepers.

Beaming

Default
Beam Selected
Unbeam Selected

- *Default* uses normal rules regarding beaming.
- *Beam Selected* forces the selected notes to be beamed. It will beam across bar lines, but not between staves.
- *Unbeam Selected* removes the beams from selected notes.

In order to get beaming set to your preferences, you may occasionally have to unbeam notes around the area you want to change, and then rebeam to meet your needs.

Ties

Default
Up
Down

You can also change the default orientation of any ties you use in LOG-IC. To do this, select the note at the start of the tie, and set the desired orientation from the **Attributes Menu** under **Ties.**

- *Default* undoes any changes and places a default tie, whose orientation depends on the notes in the tie and their respective positions on the staff. This function can also be accessed via a key command.
- *Default* uses normal rules regarding position of the notes in the staff, which way stems are assigned, etc.
- *Up* and *Down* change the selected note(s) upward or downward.

Syncopation

Default
Force
Defeat

Syncopation can now be set *locally*, i.e. for a small selection of notes. In the **Attributes Menu**, there are the following entries to control this option:

- *Default* uses the setting for *Syncopation* that has been chosen in the Display Parameter Box;
- *Force* will cause notes that would normally have been displayed with ties to be displayed as single notes, when possible and/or reasonable;
- *Defeat* undoes any syncopation that has been applied, either via the *Default* setting or by *Force* syncopation.

Interpretation

Default
Force
Defeat

Interpretation can now also be set *locally*, i.e. for a small selection of notes. In the **Attributes Menu**, there are the following entries to control this option:

- *Default* uses the setting for *Interpretation* that has been chosen in the Display Parameters Box.
- *Force* causes selected notes to be "interpreted", which typically lengthens shorter notes to avoid unusual looking rests
- *Defeat* undoes any interpretation that has been applied, either via the *Default* setting or by *Force* interpretation.

Independent Notes

Independent notes are notes that aren't subject to the usual rigorous application of rhythmic logic. That is, LOGIC will make no attempt to make them fit into the "bar/beat" framework, add up to the correct number of beats, etc. They can be used in some circumstances as a substitute for a polyphonic score style, to display independent rhythms. Their primary limitation in this role is that they cannot be beamed or share a stem, and no automatic rests are supplied for them.

- *Independent Grace* makes any selected notes into grace notes. They will be smaller, have a slash, and a slur/tie into the next note. It may be necessary to graphically move notes with the Layout Tool (either the grace notes, or other notes) in order to produce a correct display with grace notes. Stem direction may be edited, if you wish.
- *Independent* simply removes a note from the rhythmic logic of the rest of the notes. Its displayed length cannot be dotted, so only even duple note values are possible, even when Interpretation is defeated for the note.
- *Not Independent* returns a note to the normal rhythmic logic of the display.

It's also possible to enter *Independent* notes directly by holding and entering notes in the usual way with the mouse.

The following note attributes can be applied to independent notes in the same manner as to »normal« notes; Hide Stem, Stem Direction, Enharmonic Shift, Hide/Force Accidental and Tie Direction (selecting Tie direction while an independent note is selected will add a tie to the right of the note in the direction you select). You may also apply one of the alternative note head symbols to an independent note, including the one which hides the note head.

Before resorting to using *Independent* notes to handle complex polyphonic problems, consider adding a **voice** to the current Score Style, without automatic rests. That may give you more polyphonic flexibility than *Independent* notes.

12.9   Note input in the Score window

Real-time recording

Real-time display
Notator LOGIC is capable of scoring a recording in real time if the Score window is open. In order for this to work, the combination of Instrument Set and arrange level must be such that a sequence in the selected track is visible (assuming the sequence is already there, that is).

Choose the Record track while in the Score window
Selecting a stave in the Score window automatically selects the corresponding track in the Arrange window as the current Record track .

Merging new recording into existing staves
Under **Song Settings>Recording Options** you can select *Merge New Recording With Selected Sequences.* That means that any new material you record will be merged into whatever sequences you've selected in the Arrange window, *provided that they're in the track you've selected to record into.* This is great for recording directly into existing Score staves. Here's one way to set it up:

- In the **Song Settings>Recording Options** menu, select *Merge New Recording With Selected Sequences.*

- Open an Arrange window, if one isn't already open.

- Create several blank sequences in the Arrange window, as long as your song is going to be, and using the tracks whose Instruments you want to hear.

- Select all the sequences, and open the Score window using the Windows menu, or via the key command (⌘3) but NOT by double-clicking on a sequence object).

- An Instrument set will have automatically been created to display all the sequences. You should see as many blank staves as you have sequences in the Arrange window. (Of course, you can rearrange the staves into the order you want, connect brackets and bar lines, etc., by editing the Instrument set from the window of the same name.)

- Arrange your windows so that you can see as many as possible of the sequence objects in the Arrange window, and the score staves in the Score window.

Now, just select the track Instrument you want to record into in the Arrange window. That will automatically select the sequence object(s) in that track. When you record, starting at any point in the track, your recording will be immediately visible in the Score, and will be merged with whatever music already existed in that track/sequence/staff.

You get instant feedback as you play, your music is instantly part of your score without additional merging steps, you have the convenience of printing a readable score at any time for feedback as you work, and when you're done recording and editing, you're really done.

Any sequences you mute in the Arrange window won't be displayed in the Score window until they're unmuted.

Step-Time recording

In the Score window, step-time input works exactly like it does in the Event List and Matrix Edit windows. All the procedures are identical, but it's worth giving you a few hints at this point nevertheless.

- If you want the notational display to show you exactly what you're recording, you need to disable *Interpretation* and *No Overlap* in the Display Parameter box, for the sequence you're inputting into.

- It makes sense to choose a Score Style whose basic clef(s) can conveniently show the notes you plan to record.

- Don't use *default* for the *Qua* setting. Since step-time recording involves constantly changing the *Display Format*, the notation will constantly change in confusing ways if you use *default*. Instead, choose the largest *Qua* value that can display the shortest notes you plan to record. Remember that if you plan to record both triple and duple values, you need to use a hybrid *Qua* like *16,24.*

- While you can record new notes into one staff of a score display in step time, *you must be sure the staff is selected* where you want to record the notes. If you're looking at a score, but no staves are selected, step-time entry has no effect. If more than one staff is selected, the one highest in the score display is the one you will record into. Of course, at the lowest level (display of a single sequence) the staff is always selected, so this is not a problem.

12

- When you're viewing a score display that shows successive sequences in the same track, you can do step-time recording in a seamless way, even when you cross boundaries between the sequences. For this to work properly, be sure that successive sequences begin *exactly* where the previous one ended.

Here's how the Arrange window should look. Notice that the sequences share boundaries, but don't overlap.

The corresponding Score window might look like this:

This example was made in the following way, by:

- Creating the blank sequences in the Arrange window.
- Entering the score window.
- Using an Instrument set that allows all the sequences assigned to that track to be viewed.
- Starting step-time recording at the beginning of "Sequence1".
- moving automatically to record in "Sequence2" when the join between "Sequence1 and "Sequence2" is reached, allowing step-time recording to continue seamlessly.

- Step-Time and polyphonic score styles can be a great combination. Since the MIDI channel of the notes determines their *voice* assignments in a polyphonic score style, you can control what *voice* notes will go into by simply changing the MIDI channel of your MIDI keyboard as you enter notes in step time.

- As usual, when you're done with step-time entry, *TURN IT OFF* by clicking on the MIDI In icon again. Otherwise you may record a lot of notes you don't want by just playing or practicing.

As an alternative to recording MIDI sequences, LOGIC allows you to enter whole scores using the mouse and the keyboard. You can also combine both input methods.

You can't put something into nothing

If you want to input a piece of music from scratch in the Score window, you must:

- Create empty sequences in the Arrange window, placing them in tracks where they'll be played with the correct Instruments, and setting their lengths as required.

- Create an Instrument set (if you wish to control score layout) which displays the empty sequences in a blank but correctly formatted score, similar to the process described under »Real-time recording techniques« above.

- Create other Instrument sets as needed to isolate your view to only certain combinations of staves, or even individual parts, so that you don't inadvertently enter musical graphics into the wrong staff.

- Now you have an empty score into which you can insert notes with the mouse (or use a combination of mouse entry and the real-time merging entry described above).

Tip: if you will be frequently creating scores using this method, take the time to create a song with an »empty score« using your favorite instruments, and define it as a Macintosh Stationery Pad. See your Macintosh manual for more details on the Stationery Pad function.

Any sequences you mute in the Arrange window won't be displayed in the Score window until they're unmuted.

12

12.10 Page layout

Sequence boundaries determine staff end points

There is an exact correspondence between the length of a musical staff in the Score window and its length in the Arrange window. You can make use of this relationship to create scores with variable staves. On the other hand, you must take this into account when you want to produce a score where every Instrument that ever plays is represented in each stave, with rests if necessary.

Editing the layout

Basic, global layout settings are found and made in the format parameters under Song Settings (**File > Song Settings > Global Format**). For more on this, read Chapter 14Song Settings and Preferences1.

Although these global settings will suffice for almost all your scoring needs, fine-tuning can be performed in the Note Editor window with the Layout tool. Using this tool, you can easily adjust the »bars per line« of all printed parts. In addition to this, the Layout tool can adjust the proportional spacing of single notes. All in all, it allows the scoring of even the most demanding parts.

The layout tool is situated in the note editor toolbox, right next to the solo tool. It's the same shape as the pointer, but the arrow is not solid black — it just has an outline around it.

Moving bar lines with the layout tool

In *Page Edit* and/or *Print View*, the Layout tool can shift bars upward to the previous line and downward to the following line. This is called Line Shifting. When a bar is shifted to another line, the following lines' format will be deleted. As a result, all the following lines are formatted according to the settings in the global format. To defeat this and preserve the Format of the subsequent lines, hold ⌘ while performing the edit with the Layout tool.

The Line Shift information is stored independently for each score, or for each combination of sequence/folder and Instrument set. Here's how to do it:

- Make sure you are in Page mode.

- Select the Layout tool

- Locate the bar you wish to move.

- Click and hold on the staff of that bar. A »hand« appears in place of the Layout tool. Be sure to click directly on the staff, but not on any note, text or graphic.

- Drag up or drag down. If you drag up, the hand will change to signify you want to move the bar to the previous line. If you drag down, the hand will change to signify you wish to move the bar to the following line. When you see the hand change to reflect your wishes, release the mouse. The screen will change to show your edit, moving the bars as you've commanded.

There is no limitation on which bar of a line you select to move in this way. It can be the first, last, or anything in between. If you find you're doing this a lot, you might want to consider making a change to the global format.

Moving notes with the layout tool

In either page or linear mode, the proportional spacing of all notes can be easily adjusted using the Layout tool. This allows you to correctly space difficult or complex musical passages, make room for unusual text, chord symbol or graphic events, etc. If you find you're doing this a lot, you might want to consider making a change to the global format. Two ways of activating the Layout tool exist: direct selection from the toolbox has already been mentioned, while the other is especially suitable for moving notes.

- Select the ordinary, solid pointer tool, press `ctrl`, select a note, and hold down the mouse button. The pointer will change to the layout tool.

- Keep holding the mouse button, and drag the note to achieve the desired position or rhythmic look. As you drag, the left side of the INFO line will show you the amount of horizontal shifting you're doing to the note. Notice that this affects the proportional spacing of the note.

- If multiple notes are selected when you use the Layout tool, the graphic drag affects all the selected notes proportionally, in the same way. *The Layout tool is capable of all the selection methods the normal pointer tool can use.*

- When finished, switch back to the regular pointer.

- To undo this graphic shifting, either use the Layout tool or hold `ctrl` and double-click on shifted notes (or a group you've selected). The notes will return to their original positions.

The graphic shift function also affects tied notes.

Note: the Layout tool has graphic results only. The regular pointer tool changes the musical time and pitch of notes.

Be careful to move the note(s) in small increments. Using the Layout tool will slightly alter the proportional position of the surrounding notes. Always ask yourself if what you're trying to do could be better achieved by altering the related global format parameters. In most cases a change there is all you need for LOGIC to produce a correct, readable printout of your music.

12

The former function is only designed to be used for fine-tuning, and for that reason, should only really be used while making the last adjustments before you print out.

If the note requires special handling outside the context of the metrical rhythm (grace notes, mordents, flams, etc.) consider making it an Independent note (see the section *Independent Notes* on page 12 - 77).

Reset Line Layout

The command »*Reset Line Layout*« from the Score window's Layout menu allows you to delete all Line shift information for the score currently being displayed. It is also available as a key command, so you can set your own key shortcut. It returns the display to the global format settings.

Editing object size graphically

The Sizer Tool is used to graphically adjust the size of objects. It is effective on text, musical graphics and notes.

Using it is extremely simple. After selection of the sizer tool, click and hold on the object(s) whose size you wish to adjust. (You can use all common selection methods with the sizer tool, if you want to adjust several at once.) Still holding the mouse button down:

- just drag up to make the object(s) larger,

- or drag down to make the object(s) smaller.

- You'll see the object change size as you move the mouse.

- The INFO line will read "*Scale Objects*" and a number reflecting the size of your adjustment, from -*16* to +*16*.

- Release the mouse button.

This is similar to numeric editing with the mouse.

It might be a good idea to zoom in on the object whose size you wish to adjust. You'll get a more accurate sense of the amount of adjustment required, and a better sense of how it will print.

Quick adjustments before printing

Some of these operations are covered elsewhere in this chapter, but are mentioned here for convenience.

Change of clef

A double-click on a clef opens the Clef window, in which you can select a new clef. *Please note*: if you edit the clef defined in the Score style at the beginning of a sequence, the corresponding entry in the Style is edited as well, so all sequences using this style also use the new clef.

Change of key signature

A double-click on a key signature opens the key signature edit dialog, in which you can select a new key signature. *At the beginning of a sequence*, you can double-click in the space between clef and time signature, and the key signature edit dialog will appear, even if no key signature was visible (as in the key of »C«). You can disable the appearance of double flats and sharps in the dialog box.

Change of time signature

A double-click on a time signature opens the time signature edit dialog, in which you can select a new time signature.

Changing margins, title space

In *Print View* dotted lines appear which represent the margins and title space (the »header« space). You can drag them with either the usual solid pointer tool or the Layout Tool (the clear pointer tool). Dragging them automatically edits the *Numbers & Names* settings.

Changing the space above a staff

You can drag a staff up or down by the clef sign and the space above the staff will be edited. The ↑*Space* setting of the corresponding Score Style is automatically edited, and will affect any other sequences using the same Score Style. If you want your change to affect only this sequence, select the new Style ****Duplicate****, before dragging the clef. That way, you'll be editing a copy of the Style, and other staves/sequences won't be affected.

Adding connecting bar lines

The bar lines that connect staves can also be edited with the mouse directly on the score, *when the score is in page edit or print view.* When you click on the upper corner of a bar line (where it meets the top of a staff), it will alternate between being connected or not connected to the staff above it. When this graphic method is used, the corresponding setting in the Instrument set or Score Style is edited automatically. The Instrument set is changed if the staff above represents a different

12

4

sequence. The Score Style is changed if the staff above is part of the same Score Style as the one you clicked on.

Changing bar and page numbers, instrument name style

Just double-click on a bar number and the *Numbers & Names* dialog box appears, allowing you to change most aspects of these, as described in the section *Page Numbers* on page 14 - 13.

For example, to place the bar numbers *beneath* a staff, simply enter a negative value for the *Vert.pas* setting.

12.11 Printing

Basic Process

Choose Page Setup

Before printing or even doing serious formatting in that direction, you should choose »Page Setup...« from the File menu to determine the page size (e.g., DIN A4, A5 or US Letter) and the other usual printing parameters. This is similar to how other applications work.

Formatting the page

Generally, you should not print until you've looked at the music in *Print View* (View menu). Adjust the margins, etc., as described in the section *Quick adjustments before printing* on page 12 - 84 .

Select a Score window, and Print

Before actually printing, a score window displaying the music you want to print *must* be the top (selected) window.

. Start printing by selecting **File > Print...** , or just press ⌘ℙ. As with other applications, you can choose which pages to print, etc. A test print of one or two pages might be a good idea, to verify your settings.

Postscript with Adobe Sonata Font

As an alternative, LOGIC can also use the Adobe Sonata Font for note display. Provided that the Sonata Font is properly installed in your system, you simply need to select the option »*Use Adobe Sonata Font (if*

available)« in the »*Score Preferences*« (Options menu). LOGIC now uses this font both for displaying and printing notes. You can also choose the »*Score Preferences*« option »*Only for printout*«, so that LOGIC's internal font is used for screen display, which is considerably faster.

By creating a Text Style accessing the Sonata Font, you can use any of the musical symbols available in the Sonata Font.

This font also support postscript printing. If you own a postscript printer which can reroute the printer-output to a file, you can even export the score as an EPS file.

Please ask your Apple dealer for the Adobe Sonata Font, as it is not yet enclosed in the LOGIC program package. Adobe Type Manager is also recommended for use with Sonata Font.

12

Chapter 13
The Transform Window

Usage

The Transform window can be used to alter existing events according to definable parameters. These parameters can be saved as transform sets and called up again for later use (for more on this, read the section *Calling up Presets and your own Sets* on page 13 - 10).

The Environment contains a similar transformer object for real-time editing of MIDI data (see the section *Transformer* on page 7 - 32).

For those of you who may be used to sequencers such as Vision and Performer, the Transform Window will likely be one of the more initially confusing areas of LOGIC to learn. Those who are experienced with Cubase and Notator SL will be in familiar territory, because the Transform Window follows a similar format to certain pages found in those programs.

Although not immediately "friendly", the Transform Window provides an extremely high degree of flexibility and power when you need to perform complex edits and transformations of MIDI data. A short time spent mastering its operation will yield substantial rewards during your sequencing sessions; you will find that there is practically no edit operation or transformation that you can't accomplish here.

Opening the Transform Window
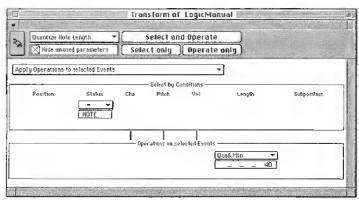
Choose **Windows > Open Transform** (⌘⌐4⌐) to open a new Transform window.

Effective Range

The Transform window is used to edit events only. The effective range is the same as for other functions, ie:

- All selected events (in one of the editors),

- All events in selected sequences, or

- All events in selected folders.

You can use the link button in the top left corner to link the effective range with other windows.

All selected events on the same display level fall within the effective transform range, as do all the events in the selected arrange objects.

The title bar of the Transform window indicates the effective range by giving the name of the song, and, if applicable, the name of the first selected sequence:

Purpose of the Transform Window

Conditions
This part of a transform function defines which events will be edited. If the *Select and Operate* or *Select only* options (see below) are used, the transformer checks to see whether the individual parts of the events (e.g. Position, Status, Channel, etc.) fall within the effective range as defined in the pull-down menus under *Select by Conditions*.
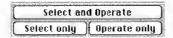
Operatians
This portion of the transform is where you define the edit operations to be carried out. These operations are defined in the pull-down menus under *Operations an selected Events*.

Logic

Actions

Select and Operate

Select only | Operate only

These three buttons implement the actions in the Transform window:

Select only

All events in the effective range which fulfill the set *Canditians* are selected (*Operotions* has no effect). You can use this action to define your own selection commands.
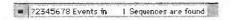
Operote only

All selected events are transformed according to the set *Operotions* (*Conditions* has no effect). This action is useful if you want to edit events you've already selected by hand.

Select and Operate

This is a combination of both the above actions: first, selection according to *Conditions*, followed by transformation according to *Operations*.

After each action, you can see how many events have been selected and/or transformed in the title bar, as shown below:

?2345678 Events in   1 Sequences are found

After activating *Select only* you can alter the selection in an editor before carrying out the transformation by activating *Operote only*.

13.1   Transformation

13

Mode

You define the basic operating modes in the pull-down menu above the conditions box:

Apply Operations to selected Events

As described above, the *Operatians* are carried out on the selected events (default setting).

Apply Operations & Delete unselected Events

The selected events are edited, but in addition all non-selected events are deleted. This ensures that the only events remaining after the transform operation are the ones that matched the *Condition*.

If you set the *Operations* up neutrally, you can use the Transform window in theis mode as a programmable filter – only events which match the *Condition* survive.

Delete selected Events

The selected events are deleted.

In this mode you can use the Transform window as a programmable erase function. All the events which match the *Condition* are deleted, and all other events remain unchanged. The *Operations* setting is irrelevant with this mode.

Copy selected Events & Apply Operations

The selected events are retained in their original form as well as being copied and edited.

You can use this mode for applications like the following:

Imagine you want to add a mod wheel controller event (#1) 10 ticks before each existing note, containing the note velocity value. To do this, you set *Status* as *Note* (this is the Condition) and the *Pasitian* as Sub *10* (or Add *-10*), *Status* as *Fix Contral* and *-1-* as *Fix 1* (these are the operations). The last of these operations means "the first data byte (- 1 -) receives the value 1" (the first data byte defines the controller number for controller events, and mod wheel events happen to be #1).

Event Parameters

The individual MIDI event parameters have their own columns in the *Conditions* and *Operatians* fields:

Position

Time position of the event, referenced to the start of the sequence. (not of the Song)

Status

Type of event.

Cha

Recorded MIDI channel of the event.

Logic

-1- / Pitch
First data byte (note or controller number).

-2- / Vel
Second data byte (velocity or controller value).

Length
Length of the note.
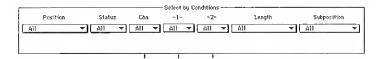
Subposition
Time position of the event within a bar.

Conditions

The middle area of the window (*Conditions*) is where you define the conditions, which in turn determine which events are selected for the edit operation. Each column represents a different MIDI event parameter.

The condition is considered to be fulfilled when an event matches the defined effective range of all the event parameters. These ranges are defined in the pull-down menus found under each of the event parameter columns. (except the Status column) The possible value conditions are listed below.

The *All* setting in the top box means that all values fulfill the conditions, which makes all the other boxes superfluous.

Position, Cha, -1- / Pitch, -2- / Vel, Length, Subposition
You can assign one of the following value conditions for each of the parameters(except the status):

=	The value in the event and the value in the box below it must be equal if the condition is to be fulfilled.
Unequal	The value in the event and the value in the box below it must be *unequal* if the condition is to be fulfilled.
<	The value in the event must be smaller than the value in the box below it if the condition is to be fulfilled.
>	The value in the event must be larger than the value

13

in the box below it if the condition is to be fulfilled.

Inside   The value in the event must be within the value range of both the boxes below it if the condition is to be fulfilled.

Outside The value in the event must be outside the value range of both the boxes below it if the condition is to be fulfilled.

Status

You have a choice of just two settings here, *All* (= all event types fulfill the condition) and "=". If "=" is defined, you choose in the box below (via the pull-down menu shown in the diagram) which event type theconditions should fulfill.

Operations

The bottom part of the window (*Operations*) is where you define the operations, with separate columns for each MIDI event parameter.

The *Thru* setting in the top box means that the relevant event part remains unaltered, which makes the other boxes superfluous.

Pasitian, Cha, -1- / Pitch, -2- / Vel, Length, Subpasitian

For all parameters (except status) the top box determines thetype of operation which is carried out using the values in the boxes below (referred to as the "set value"). The following operations are identical for the channel and the first or second data byte, but the value ranges in the boxes below are automatically adjusted.

Fix   The parameter is fixed to the set value.

Add   The set value is added.

Sub   The set value is subtracted.

Min   Parameter values which are less than the set value are replaced by it. Larger parameter values remain unaltered.

Max   Parameter values which exceed the set value are replaced by it. Smaller parameter values remain unaltered.

Flip	The parameter values are reversed around a set point. Values above this amount are moved to the same distance below it and vice versa.
Mul	The parameter value is multiplied by the set value (4 decimal places).
Div	The parameter value is divided by the set value (4 decimal places).
Scale	The parameter value is multiplied by the top value and the bottom value is then added. This is a combination of *Mul* and *Add*. Negative values can be used to generate an inversion of the plus/minus sign and subtraction.
Range	Parameter values outside the set value range are replaced by the values of the limits (combination of *Min* and *Max*).
Random	Random values are generated within the set limits.
+ - Rand.	A random value between nil and the set value (positive or negative) is added.
Reverse	The parameter value is reversed within its value range (no value can be set here).
Quantize	The parameter value is quantized to a multiple of the set value.
Qua&Min	Like *Quantize*, but the quantization does not fall below the set value (a combination of the *Quantize* & *Min* functions with the same set value).
Exponent.	The parameter value is scaled according to an exponential function. The extreme values (0 and 127) remain unaltered. The set value determines the shape of the curve. Positive values have an exponential scaling (increasing input values remain lower for longer and then rise faster), and negative values have a logarithmic scaling (decreasing input values remain higher for longer and then drop off faster).
Crescendo	This only works if the position condition "Inside" has been selected (crescendos have to have some sort of start and end points!). Crescendo creates a smooth alteration in the current parameters between the set value boundaries.
Rel.Cres	This also only works if "Inside" has been selected as

13

the position condition. The effect is similar to that achieved by Crescendo, but here the previous values of the parameters you're changing are taken into account when the crescendo is created, preserving the relative feel of the original.
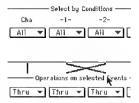
Here's an example: creating a crescendo in note velocity values. First select "Inside" as the position condition, and "Status = Note", then set "Crescendo" as the operation, with the minimum and maximum value, in the "-2-" or "Vel" column. Depending on whether the first value you set is smaller or larger than the second, you will get either a crescendo or a decrescendo. The original values of the events you change are irrelevant after the transformation, as they are completely changed by the crescendo function. In contrast, with the Rel.Cres. option, the original dynamics assigned to the notes will shine through even after Crescendo has been applied.

Status

The only two possible settings here are *Thru* (= the event type remains unaltered) and "*Fix*" (= the event type is altered). Clicking in the box below opens a pull-down menu where you can choose between note, poly pressure, control change, program change, channel pressure or pitch bend.

Exchanging Parameter Values
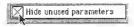
You can replace the value of each of the three event parameters *Cha, -1- / Pitch* and *-2- / Vel* with the value of a different parameter from this group. Click on the lines between the *Conditions* and *Operations* fields to change the source for the parameter value.

First the value is exchanged, and then the operation is carriedout.

Display

☒ Hide unused parameters

The *Hide unused Parameters* checkbox allows you to remove all the un-used pull-down menus in the conditions and operations boxes.This gives you a better overview of the settings made, and also protectsthe hidden menus from any accidental alterations.

13.2 Transform Parameter Sets

The settings for all the parameters described in the section *Transforma-tion* on page 13 - 3 can be stored in transform parameter sets, which are available from the pull-down menu on the top left.

Transform
Double Speed
Half Speed
Humanize
Reverse Position
Reverse Pitch
Transpose
Exponential Vel
Velocity Limiter
Fixed Note Length
Maximum Note Length
Minimum Note Length
Quantize Note Length
Transform Parameter Set
Transform Parameter Set
** Create User Set! **

Your Own Sets

To store your own settings in a user set choose the bottom menu item:
*** Create User Set! ***.

You can name the newly-created transform parameter set by double-clicking on the selection field. All settings made are stored immediate-ly.

Presets

The first twelve items in the pull-down menu are write-protected as useful presets. The first time you try to alter any of their parameters-LOGIC reminds you that you will not be able to save these alterations. However, you can alter the presets for your own purposes.
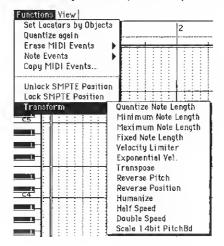
Try calling up some of the presets to acquaint yourself withthe Trans-form window and its parameters.

- Double Speed (doubles the tempo by halving positions and lengths)
- Half Speed (halves the tempo by doubling positions and lengths)
- Humanize (adds a random value to the position, velocity and length)
- Reverse Position (generates the reverse of a section)
- Reverse Pitch (inverts the pitch)
- Transpose (transposes the notes)
- Exponential Velocity (alters the scaling of the velocity curve)
- Velocity Limiter (limits the velocity)
- Fixed Note Length (creates constant note lengths)

13

- Maximum Note Length (limits the maximum note length)
- Minimum Note Length (limits the minimum note length)
- Quantize Note Length (quantizes the note length).

Calling up Presets and your own Sets

In the Event , Matrix and Hyper Editor windows, a sub-menu can be opened via **Functions** > **Transform**, from which the individual Transform pages can be directly selected (see below).

Chapter 14
Song Settings and Preferences

Both the **Song Settings** and the **Preferences** can be reached via the **File** menu. Both consist of a dialog box with a pull-down menu along the top which allows you to access various different sub-pages. Some of these pages can also be reached directly from LOGIC's local menus (for example in the Score window) or from the transport buttons via pop-up menus.

The Song Settings and Preferences are where you can define some of LOGIC's basic operating procedures. This section explains each of these windows' menu items individually. Unless indicated otherwise, the descriptions of the various options here are the ones that apply when the checkbox next to the option is crossed (in other words, when it's active).

14.1   Song Settings

Song settings are saved independently with each song, which means that different songs can have different song settings. You can save all of your standard settings in the Autoload Song, which is the default song file that is automatically loaded when you boot up LOGIC (unless you've started the program by double-clicking on a specific song file instead of the actual program icon.) This way, you can start each LOGIC session with your preferred working setup.

To reach the pages of the song settings dialog window, choose **File > Song Settings** from the main menu.
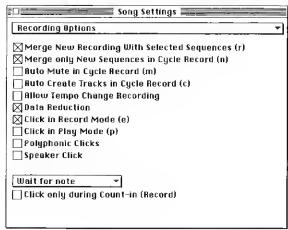
Recording Options

This page can be reached in various different ways: either by key command (*Recording Options...*), via the local menu in the Arrange Win-

dow (**Options > Recording Options**), or via **Recording Options** in the metronome switch pull-down menu on the Transport bar.

The settings here determine how LOGIC responds in record mode. If this page is open you can enable/disable some of the checkboxes via the computer keyboard using the Macintosh keys indicated in brackets after the function. While this page is open, any key commands normally assigned to these keys will be temporarily deactivated.

```
┌─────────────────────────────────────────────────┐
│ ▤□══════════════ Song Settings ═══════════════  │
├─────────────────────────────────────────────────┤
│ │ Recording Options                          ▼│  │
│                                                  │
│ ⊠ Merge New Recording With Selected Sequences (r)│
│ ⊠ Merge only New Sequences in Cycle Record (n)   │
│ ☐ Auto Mute in Cycle Record (m)                  │
│ ☐ Auto Create Tracks in Cycle Record (c)         │
│ ☐ Allow Tempo Change Recording                   │
│ ⊠ Data Reduction                                 │
│ ⊠ Click in Record Mode (e)                       │
│ ☐ Click in Play Mode (p)                         │
│ ☐ Polyphonic Clicks                              │
│ ☐ Speaker Click                                  │
│                                                  │
│ │ Wait for note            ▼│                    │
│ ☐ Click only during Count-in (Record)            │
│                                                  │
└─────────────────────────────────────────────────┘
```

Merge New Recording With Selected Sequences (r)

After each recording, all newly-recorded data is merged with all the selected sequences on the recorded track to form one sequence. The **"Merge only New Sequences in Cycle Record"** function is automatically activated (see below).

Merge only New Sequences in Cycle Record (n)

When recording with Cycle Mode enabled, this function merges all data recorded during later cycles to the sequence recorded during the first cycle. It can be used independently of *Merge New Recording With Selected Sequence.*

Auto Mute in Cycle Record (m)

If recording with Cycle Mode enabled, this function creates a new sequence for every cycle during which there is a data input, and all sequences made during previous cycles are automatically muted. If the *Auto Create Tracks in Cycle Record* function (described next) is not active, all the sequences are layered onto one track. This function deactivates both the merge functions.

Auto Create Tracks in Cycle Record (c)

While recording with Cycle Mode enabled, this option creates a new track with each new cycle when there is data input. The recorded sequences from earlier cycles are pusheddown to the tracks below, so the "oldest" tracks end up at the bottom. This function deactivates both the merge functions. This function is useful when, for example, you are doing multiple takes of a solo while cycling a section of music. Recordings made during each repetition of thecycle will appear on their own track, making it easy to sort through them when you have finished playing.

Allow Tempo Change Recording

All tempo changes made in record mode are recorded. For detailson how to edit these "tempo recordings" please see the section *Tempo* on page 16 - 1.

Data Reduction

Controller events are thinned out during the recording to lessen the data load on the MIDI bus during playback. This improves the timing of dense arrangements on interfaces with fewer MIDI ports. The function actually reduces the duration of controller events using anintelligent algorithm which retains the value at the end of a succession of controller data.

Click

Click in Record Mode (e)

The metronome click is automatically switched on for recording. This is the same as activating the metronome switch in the transport panel during the recording.

Click in Play Mode (p)

The metronome click is automatically switched on for playback. This is the same as activating the metronome button in the transport panel during playback.

Polyphonic Clicks

The MIDI metronome object in the Environment sends all notes defined and activated for bars, beats and divisions (see the section *MIDI Metronome Click* on page 7 - 39). For example, at bar positions two or three notes may be sent simultaneously. If the option box is not checked, the more common notes are not sent whenever there is a less common note (e.g. bar), so that the metronome only ever transmits one note at a time.

14

Speaker Click

This sends the metronome click to the computer loudspeaker.

Count In

This pull-down menu is where you set the count in that precedes a re-cording.

Woit for Note: LOGIC keeps running in a symmetrical loop (length = 1 beat) centered around the start point of the recording until MIDI events are input. Since the loop starts half a beat before the start point, you are allowed up-beat notes of up to half the value of the bar denominator (e.g. with n/4 time, a maximum of 1/8 notes).

No count-in: the recording begins with no count in.

*1-6 Bor count-in:*1-6 bars of count in.

*2-10/4 Count in:*A count in of between 2/4 and 10/4. These settings are useful when the count in falls during a bar change.
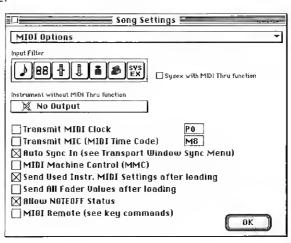
Click only during Count In (Record)

When this option is active, the record click only sounds during the count in. and is then switched off.

MIDI Options

This page can be reached from the Arrange window by selecting **Op-tions > MIDI Options**, or from anywhere via a key command (*MIDI options...*). These settings determine how the MIDI inputs and outputs behave.

Input Filter

The input filter switches are for filtering out certain event types at the input of the sequencer. The symbols correspond to those in the Event List. A dark gray switch filters out the relevant events.

Note Events

Program Change Events

Pitch Bend Events

Controller Events

Aftertouch or Channel Pressure Events

Polyphonic Key Pressure Events

System Exclusive Events.

SysEx with MIDI Thru Function

SysEx messages are passed through the computer, which is particularly important when using hardware programmers to allow you to monitor the changes to the sound immediately. If you just want to record SysEx dumps don't cross the checkbox. It hardly ever makes sense to divert dumps through the computer unless you want to record a dump and simultaneously transmit it to a second device of the same make.

Instrument without MIDI Thru Function

Any instruments selected here from the instrument pull-down menu will not pass on events through the computer when the instrument is chosen for the selected track. Normally the "No Output" instrument is set here.

If your master keyboard does not have a "Local Off" setting, you can use this feature to avoid unwanted note doublingwhen recording.

- With multitimbral sound sources: select the instrument which represents the multitimbral part of your master keyboard that you hear when you play.

- With monophonic sound sources: select the instrument which represents the sound generating part of your master keyboard.

In both cases, you should turn down the volume control of your master keyboard whenever you are recording tracks for another instrument.

Synchronisation

Transmit MIDI Clock

LOGIC transmits MIDI Clock with song position pointers. For more about these terms, please see the section *MIDI Clock and Song Position Pointer* on page 16 - 21. The MIDI output is selected on the right of this option (see the next paragraph).

Transmit MTC (MIDI Time Code)

MIDI Time Code is transmitted. You may set the MIDI output port in the little box next to it. You can input a value by either using the mouse as slider or via the keyboard. *M* and *P* refer to the *Modem* and *Printer* ports and the independently definable number (*0-31*) refers to the number of the MIDI port. Zero stands for "all outputs". The "÷" setting stands for "all the Modem and Printer Port outputs".

Auto Sync In

LOGIC can recognize any valid synchronization format received at any input and can synchronize automatically to it. If you are only using one external synchronization source or, if you are certain that LOGIC will not be able to pickup any more synchronization sources from your studio setup, this setting means you don't have to bother about making any further adjustments.

Synchronization Source

If there is no cross by *Auto Sync In* you can define the synchronization source from the adjacent pull-down menu on the transport window.

Internal Sync: LOGIC always syncs to its internal clock, even if an external sync signal is available.

SMPTE Sync (MTC): LOGIC synchronizes to **MIDI** Time Code. Remember that most multi-port interfaces are fitted with inputs and outputs for SMPTE code, which is converted to MTC.

MIDI Clock Sync: LOGIC synchronizes to MIDI Clock and Song Position Pointers.

Remember that even if you have set an external synchronization source you can still start LOGIC by itself, in which case it will use its internal clock source.

MIDI Machine Control

LOGIC sends (and responds to) MIDI Machine Control commands, so it can remote-control external devices' transport functions. If these items are not checked, the functions are switched off (see also page 16 - 22).

Initialising Your Instruments

Send Used MIDI Instrument Settings after loading

After a song has been loaded, all the instrument settings (suchas program number, volume and panning) are sent to the instruments used in the song (i.e. the ones that play sequences).

Send All Fader Values after loading

After a song is loaded, all fader objects send messages containing their settings. This allows you to initialize (say) a MIDI-controllable mixing desk, if you have created a set of environment objects which control its parameters.

Allow Note Off Status

Note Off events are recorded as received. If this function is switched off, Note Off events are replaced by Note On events whose velocity = 0.

MIDI Remote (see key commands)

The MIDI remote control function for "keyboard" is switched on (see also page 4 - 26). The checkbox activates/deactivates the same function as the MIDI remote button in the Key Commands window.

Chase Events

This page is for makingsettings relating to the "Chase Events" function described on page 5 - 20. You can also reach this page from the local menu in the Arrange window by selecting **Options > Chase Events**.

Message Type Switches

These switches are used to select the event types for which event chasing applies. The symbols are the same as the ones in the Event List Editor. If a button is gray it means chase events is deactivatedfor that event type.
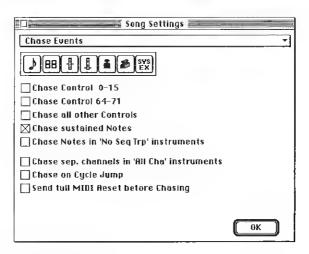
Note Events

This button affects only Note On and Note Off events in sequences played by instruments whose "No Seq Trp" (no sequence transpose) box is not checked.

14

```
┌─────────────────────────────────────────────┐
│ ▤□          Song Settings              ▤     │
├─────────────────────────────────────────────┤
│  ┌───────────────────────────────────────┐  │
│  │ Chase Events                        ▼ │  │
│  └───────────────────────────────────────┘  │
│  ┌─────────────────────────────────────┐    │
│  │ ♪ │88│ ▐ │ ▐ │ ▲ │ ▟ │SYS│        │    │
│  │             │   │   │   │EX │        │    │
│  └─────────────────────────────────────┘    │
│  ☐ Chase Control 0-15                        │
│  ☐ Chase Control 64-71                       │
│  ☐ Chase all other Controls                  │
│  ☒ Chase sustained Notes                     │
│  ☐ Chase Notes in 'No Seq Trp' instruments   │
│                                               │
│  ☐ Chase sep. channels in 'All Cha' instruments │
│  ☐ Chase on Cycle Jump                       │
│  ☐ Send full MIDI Reset before Chasing       │
│                                               │
│                            ┌──────────┐       │
│                            │    OK    │       │
│                            └──────────┘       │
└─────────────────────────────────────────────┘
```

Chase sustained Notes

This checkbox is used to search around the "jump-in" point for any notes which should still be playing because of a held-down sustain pedal.

Chase Notes in ˙No Seq Trp˙ instruments

This means that even notes played by "No Seq Trp" instruments are searched. If these are instruments for drum sounds or loops, as is usually the case, this box **should not be checked**.

Program Change Events

Pitch Bend Events

Controller Events

If this switch is active you can switch three controller groups on and off individually:

Chase Control 0-15

Controller numbers 0-15 are searched. These include the following controllers: modulation wheel, breath, foot, volume, pan, portamento time, balance and expression, plus the MSB for data entry and bank select.

Chase Control 64-71

Switch controllers 64-71 are searched. These include sustain, sostenu-to, hold 2, soft pedal and portamento.

Chase all other Controls

All other controller numbers are searched.

Aftertouch or Channel Pressure Events

Polyphonic Key Pressure Events

System Exclusive Events

The last SysEx messages in the sequences before the jump-in point are transmitted. If the sequence contains the recorded data of a SysEx fader, the fader will be set to its correct state at the jump-in point.

Please bear in mind that chase events cannot always fully restore the correct state of SysEx data at the jump-in point. To do so would involve not just searching but also analyzing all SysEx messages in the whole song both before and after the jump-in point. Because of the non-standardized data structure of SysEx messages this is completely impossible.

If even a couple of sound parameters have been recorded, each with separate SysEx faders at differing settings before the jump-in point, there will be deviations in the sound. To get around this, try recording controller data to remote-control the SysEx faders during playback instead. Since chase events searches all the different controller numbers separately, the SysEx settings for the sound parameters will all be correct at the jump-in point. Another advantage of this method is that controller events can be edited graphically in the Hyper Editor, or using Hyper Draw.

Chase separate channels in `All Cha` instruments

This option affects instruments whose *Cha* parameter is set to *All* (i.e. which play events with their recorded MIDI channel). All defined event types in sequences started part-way through are then searched separately for each MIDI channel.

Chase on Cycle Jump

Switches on the Chase Events function for cycle jumps.

For OMS users only: when you use LOGIC with OMS, no "Sustain Pedal Off" message (controller #64) is transmitted at the end of a cycle. This

Note

14
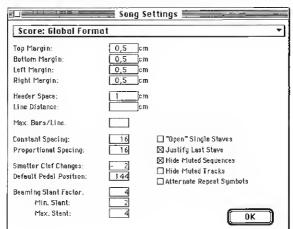
is because OMS does not support the "All cable" setting, so the controller 64 messages would have to be sent individually to every OMS object. This would cause long delays, so the function is disabled instead.

Send MIDI Reset before Chasing

A MIDI reset is sent before Event Chasing begins, in accordance with the current settings in the Preferences (see the section *Reset Messages* on page 14 - 33).

Score: Global Format

This is where you access the various different parameters that determine the format of your Score. This page can be reached from the Score window by selecting **Layout > Global Format**, or you can call it up by means of a key command (*Settings: Global Format*).

```
┌─────────────────────────────────────────────────────┐
│▤▯  ═══════════════  Song Settings  ═══════════════   │
│ ┌───────────────────────────────────────────────────┐│
│ │ Score: Global Format                           ▼  ││
│ └───────────────────────────────────────────────────┘│
│ Top Margin:          ┌─ 0,5 ┐  cm                    │
│ Bottom Margin:       ┌─ 0,5 ┐  cm                    │
│ Left Margin:         ┌─ 0,5 ┐  cm                    │
│ Right Margin:        ┌─ 0,5 ┐  cm                    │
│                                                       │
│ Header Space:        ┌─ 1 ──┐  cm                    │
│ Line Distance:       ┌──────┐  cm                    │
│                                                       │
│ Max. Bars/Line.      ┌──────┐                        │
│                                                       │
│ Constant Spacing:    ┌─ 16 ─┐  ☐ "Open" Single Staves│
│ Proportional Spacing:┌─ 16 ─┐  ☒ Justify Last Stave  │
│                                ☒ Hide Muted Sequences │
│ Smaller Clef Changes:┌─ 2 ──┐  ☐ Hide Muted Tracks    │
│ Default Pedal Position:┌144 ┐  ☐ Alternate Repeat Symbols│
│                                                       │
│ Beaming Slant Factor.┌─ 4 ──┐                         │
│     Min. Slant:      ┌─ 2 ──┐          ┌──────────┐  │
│     Max. Slant:      ┌─ 4 ──┐          │    OK    │  │
│                                        └──────────┘  │
└─────────────────────────────────────────────────────┘
```

Defining Score Spacing

Changing measurement units

The values for score margins can be given either in centimeters (cm) or inches. To switch measurements, just click on the depiction of the units being used (cm or inch).

Top/Bottom/Left/Right Margins

- This is where you find the adjustable values for the *Top, Bottom, Left* and *Right* margins.

Header Space

• This parameter reserves additional space for a ›Header‹ on the first page.

The *Margins* and *Header Space* can also be inserted graphically by dragging the respective ›dashed line‹ in the *Print View*. If there is no header space, you can create one graphically by pressing ⬆ and then dragging the top margin line downwards.

Double-clicking on any margin line opens the »*Global Format*« dialog.

Line spacing

This provides an additional vertical space between staff lines. It is normally left blank, which means no space is added.

Max. Bars/Lines

This allows you to enter the maximum number of bars in a line. Only the number of bars defined by the »Spacing« parameter (see below) will be placed in the line, and these bars will then be stretched to fit the line's entire width. Even if more bars could be fitted in, the number here overrides that.

Spacing

• The »*Constant Spacing*« Parameter increases the spacing between notes or rests independently of their length.

• »*Proportional Spacing*« takes the note lengths into account, according $\frac{1}{1}$ notes more space than $\frac{1}{32}$ notes. Both parameters can be freely combined.

Use the »*Constant Spacing*« to control the minimum spacing (i. e. between short note values), then adjust the »*Proportional Spacing*« to your taste.

Slash Spacing

You use this parameter to set the spacing for Beat Slashes, which can be switched on using the *Rest* parameter from the Score Style window.

Default Pedal Position

This allows control over the automatic vertical positioning of sustain pedal events that are recorded via MIDI.

A value of "*0*" will hide sustain pedal events, in case you prefer not to see or print them.

14

Slanted Beaming

The Global Format Dialog offers three parameters to control the slanting of beams:

Slant Factor

This controls the ratio between beaming angle and note interval.

Min. Slant

This defines a minimum angle (in arbitrary units) that has to be reached before you will get a slanted beam. Use this parameter to avoid very small angles that look worse than exactly horizontal ones.

Max. Slant

This defines a maximum angle (in arbitrary units) that will never be exceeded.

In addition to these global parameters, you can force horizontal beams within a Score Style by setting the »*Beam*«-parameter accordingly.

"Open" Single Stave

Switching on this option removes the vertical line on the left-hand side of single staves, making it 'open' (the line is only visible in Page View mode).

Justify Last Stave

This option lets you determine whether the last staff of a given instrument should be stretched to the right-hand edge of the page, or should stop where the notes end.

Hide Muted Sequences / Hide Muted Tracks

When this option's checkbox is crossed, muted sequences or tracks will not be displayed in the score. If the box is uncrossed, sequences are displayed irrespective of their mute status.

Note: individual sequences can still be removed from the display by making use of the *Score Off* option in the extended sequence parameter box.

Alternate Repeat Symbols
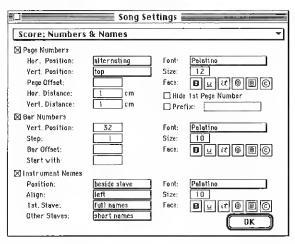
This parameter affects the appearance of all the repeat symbols in a song. Switching it on results in a "Real Book" type of display.

Score: Numbers and Names

This is where you can control various aspects of the page numbers, bar
numbers, and instrument names. This page is reached by selecting
Layout > Numbers & Names, but you can also use the keyboard
shortcut (*Settings: Numbers & Names*), which can be set up from the
Key Commands window.

```
┌─────────────────────── Song Settings ─────────────────────┐
│ ┌──────────────────────────────────────────────────────┐ │
│ │ Score: Numbers & Names                              ▼ │ │
│ └──────────────────────────────────────────────────────┘ │
│ ⊠ Page Numbers                                            │
│    Hor. Position:   [alternating]   Font:  [Palatino    ] │
│    Vert. Position:  [top        ]   Size:  [ 12 ]         │
│    Page Offset:     [        ]      Face:  B u it ○ B ©   │
│    Hor. Distance:   [ 1 ] cm        □ Hide 1st Page Number│
│    Vert. Distance:  [ 1 ] cm        □ Prefix: [         ] │
│ ⊠ Bar Numbers                                             │
│    Vert. Position:  [ 32 ]          Font:  [Palatino    ] │
│    Step:            [ 1 ]           Size:  [ 10 ]         │
│    Bar Offset:      [   ]           Face:  B u it ○ B ©   │
│    Start with:      [   ]                                 │
│ ⊠ Instrument Names                                        │
│    Position:    [beside stave]      Font:  [Palatino    ] │
│    Align:       [left       ]       Size:  [ 10 ]         │
│    1st. Stave:  [full names ]       Face:  B u it ○ B ©   │
│    Other Staves:[short names]            ┌─────────┐      │
│                                          │   OK    │      │
│                                          └─────────┘      │
└───────────────────────────────────────────────────────────┘
```

Font and *Size* for these text objects can be set either here or in the Text
Style window, where you can also add text effects (if, for example, you
want your instrument names to be printed in italics).

Page Numbers, Bar Numbers and *Instrument Names* can be turned off
entirely by clicking in the appropriate check box to disable one or more
of them.

You can edit the *Font* (from the pull-down menu), *Size* (numerically)
and *Style* (from the click buttons) of the *Page Numbers, Bar Numbers*
and *Instrument Names*. The *Style* buttons, from left to right, are **bold**,
underline, *italic*, outline and boxed.

14

Page Numbers

• Use the *Hor. Position* and *Vert. Position* flip menus to choose where
  the page numbers should appear. »*Alternating*« means that odd
  numbers appear on the right-hand side, even ones on the left-hand
  side.

• The »*Page Offset*« value is added to each page number.

- The »*Har. Distance*« and »*Vert. Distance*« parameters control the graphical position of the page numbers. You can swap between measurements in inches and centimeters by clicking on the values.

You can »*Hide 1st Page Number*« if you don't want it to be displayed or printed, by checking the box of the same name.

If you want to enter text to appear on every page just before the page number (a title, for example), enter it under the *Prefix* option when the box is crossed. The prefix text will use the same font as the page number.

Special prefix operators

\i	Instrument Set
\n	Song Name
\s	Sequence and folder name
\d	Date

Example   So if you used the following prefix operators — »\n, \i, Page:« — you might get the follwing prefix text on your printout: »Autoload, All Instruments, Page: 4«.

#	the page number appears where you put this symbol. This allows you to place the prefix text to the right of the number if you wish.

Example   So, if you want page numbers of the form »– 1 –«, simply enter »– # –« as the prefix.

Note   The prefix is automatically separated from the page number which follows it by a space — unless you're using the '#'-Option. Then no page number is added afterwards, naturally).

Bar Numbers

Vert. Positian is used to set the distance of the bar numbers from the staff.

Step governs the number of bars after which each bar number should appear. If want bar numbers on *every* bar, set *Step* to *0 (=line)*.

The *Bar Offset* value is added to each bar number.

The *Start with* parameter can be used to prevent the first bar number (s) being displayed and printed. For example, to display an unnumbered bar at the beginning represemting the upbeat, with the bar num-

bering beginning at the start of the song proper (bar 1), set *Bar Offset* to *-1* and *Start with* to *1*.

Double-clicking on any bar number in the Score window takes you to the Numbers & Names dialog box.

Instrument Set Names

Position This parameter allows you to choose whether the names appear above the staff (as in good old Notator SL) or to the left of the staves, in which case the staves are automatically indented.

Align If the staff names are to be printed beside the staves, you can decide whether you want them to be aligned to the staff or left-justified.

You can set different options for the first staff (hence *1st. Stave*) and the following staves separately (*Other Staves*):

Full names

shart names

no names

The names are defined in the Instrument Set. If you use the *ALL INSTS* Instrument Set, the instrument names will always be displayed full-length, and the short forms will not be used.

Score: Guitar Tabulature

LOGIC offers the ability to display and print compositions in standard tabulature form. Tabulature is an alternative method of musical notation. It is most commonly used for the guitar, but can be used for any stringed instrument that uses frets. Each line of a tabulature stave corresponds to a string of the instrument. Notes are replaced by numbers which correspond to the fret position at which to play the note on that given string.

In LOGIC, the user can define up to twelve tuning sets. A set is made up of the following parameters:

- Name;
- Tuning;
- Number of strings (4 to 6);
- Method of assigning string and pitch (see below).

14

The tuning sets can be selected in the Score Style window, from the pull-down menu in the clef column.
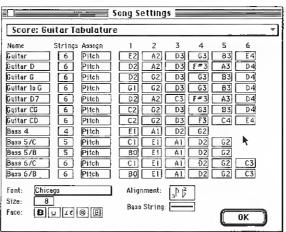
LOGIC comes pre-installed with Tuning Sets for standard guitar tuning (E A D G H E) as well as several commonly-found Open Tunings. With these sets, you should be able to create a Score Style quickly, and use this to display a part with the kind of tabulature you want.

- Open the Score Style Window (Layout menu) and select »*Single Stave Style*« under the »New« menu.

- For the clef setting, select one of the clef styles marked »*TAB*« from the clef flip menu.

- Name the Score Style something appropriate, i.e., »Guitar Tab«.

- Close the Score Style window and apply your newly created »Guitar Tab« style to the desired part using the Style parameter in the Display Parameter box.

Defining a Tuning Set

When you are ready to define your own Tuning Sets in the Guitar Tabulature Edit window, simply select **Layout > Guitar Tabulature** in the Score Window. Alternatively, you can double-click on the TAB »clef« which appears at the beginning of each tabulature staff in the Score Window.

This page can also be reached via a key command (*Settings: Guitar Tabulature*).

Each row in the Tuning Set window corresponds to a different set. The following parameters are then separately definable for each set.

Name   This is the name that will appear in the Clef pull-down menu in the Score Style window. From here, you select your tuning sets.

Strings   The number of strings in the set. You have a choice of 4, 5 or 6.

Assign   Selects one of three modes (see below) to determine how notes are assigned to strings:

> *Pitch:* The notes are assigned according to their pitch. The MIDI channel sets the limit for the lowest fret position.

> *Channel:* The notes are assigned to the strings according to their MIDI channel number. Channel 1 is assigned to the lowest string (normally bottom E), and additional MIDI channels follow in ascending order. All the channels above the highest string number are simply assigned to the top string.

> *Inv. Chan.:* Like *Channel*, except notes on MIDI channel 1 are assigned to the highest string (normally top E), and the following channels are then assigned in descending order. All notes above the highest channel number are assigned to the lowest string.

> *Inv.Chan-1:* Like *Inv. Chan*, but the notes from MIDI channel *2* upwards are assigned to the strings in descending order. All notes above the highest channel number are assigned to the lowest string, and notes on channel 1 are assigned to the top string.

> *Inv.Chan-2:* Like *Inv. Chan*, but the notes from MIDI channel *3* upwards are assigned to the strings in descending order. All notes above the highest channel number are assigned to the lowest string, and notes on channels 1 and 2 are assigned to the top string.

The last two modes can be used to diplay the MIDI output of a guitar converter with an inverse channel assignment (e.g. the Roland GR1) in Bass tabulature. Use Inv.Chan-1 for a 5-string bass, and Inv.Chan-2 for a 4-string, and play on the lower strings.

14

Tuning   The open note tuning for each string is set in the row of boxes. Each box corresponds to a string and runs left to right in ascending order.

In the lower left-hand area of the Guitar Tunings window you'll find selections for the font and size of your tabulature numbers. These settings are global for all your Tuning Sets and can also be set in the Text Style window.

The »*Alignment*« parameter on the bottom right determines the horizontal positioning of the fret numbers relatively to the stems. You can choose between a left/right-alignment (similar to standard note heads) and a stem-centered alignment.

The »*Bass String*« parameter allows you to toggle between two thicknesses of the bass string line in tabulature staves. Simply click on the string shown in the box to change its thickness back and forth.

Methods for assigning notes to strings

Since most pitches can be played in more than one place on a stringed instrument, LOGIC needs to have some method for determining which strings to assign the notes to. LOGIC has two different methods which are assignable as part of a Tuning Set.

Pitch Mode

Using the default Tuning Set as above, LOGIC employs the Pitch mode, which uses a note's MIDI channel to control the lower limit for the fret position. If, for example, the channel is set to 1, LOGIC assigns the note to the highest possible string to get the lowest possible fret position. If the channel is *4*, the lowest three frets are excluded. (Since *1* = fret *0*, *4* = third fret).

To illustrate this point, let's take an example: the note D5 on a guitar in standard tuning.

If its channel was set for *1*, then it would be placed at the lowest possible fret position, which would be at fret *3*, on the second (or B) string.

If we were to set its channel to *3* it would still remain on the B string, because it is still above the lower two frets. Once you set it to *4*, however, you'd see the note jump to the third (or G) string at fret *7*.

It would remain at that position until you set the channel to *8*, which would force it to the fourth (or D) string at the twelfth fret, and setting it to channels *13–16* would force it to the fifth string at the seventeenth fret.

Because there are only sixteen MIDI channels, you are limited to the first sixteen frets when using this mode. This should not normally present a problem, but if it does, try one of the following two modes, Channel and Inverse Channel (see below).

Channel Mode

In this mode a note's MIDI channel directly corresponds to the string on which it should be notated. A note with MIDI channel 1 would then be assigned to the 1st string, channel 2 to the 2nd string, etc. In the above example involving the D5 note, if you wanted it assigned to the third string, seventh fret, you could simply change its MIDI channel to 3.

This mode is especially useful when inputting the notes from a MIDI guitar which is set to transmit each strings notes on separate MIDI channels. It is also perhaps the best choice when inputting the notes with the mouse.

Inverse Channel

This mode works exactly like the »*Channel*« mode, except that now the MIDI channels correspond to the strings in reverse order, i.e. MIDI channel *1*=sixth string, Ch.*2*= fifth String, Ch.*3*= fourth String, Ch.*4*= third String, Ch. *5* = second String, and Ch. *6* = first String.

Notes that are lower than the lowest strings's pitch will not be shown in the score. This shouldn't be a major drawback, as these notes wouldn't be playable on a guitar with standard tuning anyway.

Special Notes for using Tabulature

• Tabulature staves behave differently than other staves when it comes to the assignment of events between the voices of a Style. Whereas all other staves may never share any notes, tabulature staves can share notes with non-tabulature staves. This allows you to create a style that combines tabulature and standard notation of the same events. You just add another stave (with a treble clef, say) to a tabulature style.

14

Since there is currently no intuitive way to transpose notes or change string assignments by dragging the notes directly on the tabulature stave, using this type of combined style is the recommended way to edit these sequences. After you have completed your editing using the conventional notation, you can change to a pure tabulature style.
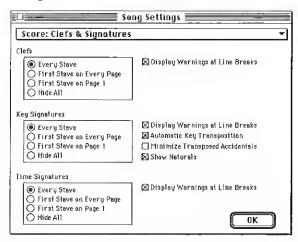
• LOGIC will ignore clef changes on drum or tabulature staves. This avoids confusing graphics, and allows the use of clef changes in se-

quences that are displayed in a combined tabulature/standard notation style.

The numbered tabulature notes can be dragged vertically to transpose their pitch.

Score: Clefs & Signatures

This page can be accessed from the Score window by selecting **Layout > Clefs & Signatures**.

These parameters determine where clefs, key or time signatures are shown in the Score. They affect the whole song globally.

The following modes can be chosen separately for clefs, time signatures and key signatures:

Every Stave

First Stave on *Every Page*

First Stave on *Page 1*

Hide All:

If clef, key or time signatures change in the middle of a song, these changes will be shown regardless of the parameters set here.

Display Warnings at Line Breaks
You will be warned of any changes due to occur at line breaks in the previous line. If you don't want the warning to appear, switch off this

option for the appropriate kind of change (clef change, key change, or time signature change).

Clefs

Smaller Clef Changes

If the clef changes, the new clef will be printed smaller than the main clef. This option determines how *much* smaller sub-clefs should be printed.

Key Signatures

Automatic Key Transposition

If this option is turned off , the global accidentals are not displayed when the Score Style is transposed.

Minimize Transpose Accidentals

Turning on this option automatically shifts the displayed key enharmonically if it is possible to generally reduce the number of accidentals by doing this, and provided the unshifted key contains no double accidentals.

Show Naturals

If this option stays turned on (as set in the default Preferences), then when key changes occur, natural symbols will be displayed for different accidentals from the previous key. If this option is switched off, no naturals will be displayed, unless the key change is from a key with accidentals to a key without any (C major or A minor).

14

Score: Extended Layout Parameters

This page contains various parameters for fine-tuning the score print-out to your personal taste. The page is reached from the Score window by selecting **Layout > Extended Layout Parameters**.

Song Settings	
Score: Extended Layout Parameters	▼
Stavelines	3
Stems	3
Leger Lines	3
Barlines	3
Endlines	3
Tuplet Brackets	3
Text Boxes	3
Crescendi	3
Dot/Note Distance	5
Dot/Dot Distance	3
Stem Length	7
Hor. Tie Position	0
Vert. Tie Position	0
Tie Thickness	3

Factory Defaults   **OK**

Line thicknesses

The thickness of the following line types can be set independently. Please note that the effect of these parameters can only be seen in the final printout or at high zoom levels. The thicknesses of the following items can be altered:

Stove Lines

Note Stems

Leger Lines

Bor Lines

Tuplet Brackets

Text Boxes

Crescendi

Distances
Dot/Note Distance

Dot/Dot Distance

Stem Length

Horizontol/Verticol Tie Position

Tie Thickness

Again, these parameters should be checked at high zoom levels or final printouts.

By pressing **Factory Defaults** you can set all parameters to their default value.

14.2   Preferences

The settings in the Preferences are saved together with the keyboard shortcuts as a special file called "LOGIC Preferences" in the System folder of your Macintosh, in the Preferences folder. These settings apply regardless of the current song.

Opening The Preferences
The Preferences window can be reached from the main menu by selecting **File** > **Preferences** or via the key command *Show Preferences*....

Although the settings you make in the Preferences affect the way LOGIC deals with *all* the songs it opens, you still have to open a song before you can alter the Preferences, for technical reasons. Please don't get confused!

Initialising The Preferences...
If you erase the "LOGIC Preferences" file in your Mac's System folder (in the Preferences folder), LOGIC will create a new Preferences file next time you boot it up. All parameters will then be reset to their default values.

When you erase the Preferences file, you also lose all your custom keyboard command assignments!

WATCH OUT!

... and how to do it *without* losing your keyboard assignments
If you'd like to initialise the Preferances, but *don't* want to lose your custom keyboard command assignments, open a Key Commands window and select **Options** > **Initialize** > **All Preferences except Commands**.

14
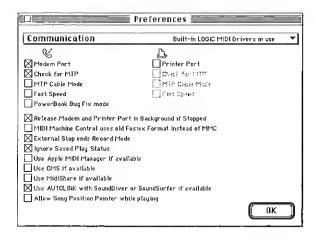
Communication
This page deals with how LOGIC communicates with your MIDI interface, and with other programs. On the right side of the titlebar, you can

see which MIDI driver is currently being used. This page of the Preferences, incidentally, can also be reached via the Arrange window's local menu by selecting **Options > Midi Interface Communication**.

If you change the MIDI driver (MIDI Manager, OMS, MIDIShare or LOGIC's own driver) you have to restart the computer before the change will take full effect.

Port

For each serial port on the Macintosh (modem or printer) you can determine whether the interface connected to that port will be used by activating the relevant checkbox.

Check for MTP

When LOGIC boots up, the modem or printer port is searched to see whether a MIDI Time Piece (MTP) is connected.

MTP Cable Mode

An operating mode is activated in LOGIC which allows it to separately address the multiple outputs of an MTP, or any other device which supports its protocol. If this option is switched off, all MIDI Out sockets will carry the same signal.

Fast Speed

The clock rate between the MIDI interface and the computer is raised from 1 to 2 MHz. This makes it easier to transfer large amounts of data particularly for MIDI interfaces with many independent outputs. The connected interface must support the raised clock rate and be set properly in order for this option to operate.

PowerBook Bug Fix Mode

PowerBook owners should activate this checkbox to circumvent a possible error in the Macintosh operating system when transferringSysEx data.

Release Modem and Printer Port in Background if Stopped

If LOGIC is stopped other programs can address the Macintoshports.

MIDI Machine Control uses old Fostex Format instead of MMC

The old Fostex format is used for MIDI Machine Control.

External Stop ends Record Mode

If you are using external synchronization and the time code stops during the recording, record mode is switched off. If there is no check in this box LOGIC stops but remains in record mode (record + pause).

Ignore Saved Play Status

The play status of a song is ignored when it is loaded. (When a song is saved LOGIC also stores the information about whether the sequencer was running or stopped.)

Use Apple MIDI Manager if available

The Apple MIDI Manager is used instead of the LOGIC MIDI driver(if it is available in the System folder). You should only activate this option if you want to run LOGIC at the same time as other MIDI programs which do not work under Autolink or OMS.

The MIDI Manager is the MIDI driver provided by Apple for internal communication between several MIDI programs in one computer, and communication with a MIDI interface. In terms of performance (timing) it is greatly inferior to the LOGIC driver or OMS. Using LOGIC with the Apple MIDI Manager is putting your new Porsche on tricycle wheels — but not even half as efficient.

Use OMS if available

The OMS made by Opcode is used instead of the LOGIC MIDI driver. The OMS System extension must be present in the Extensions folder in the System folder for this option to function.

Use MIDIShare if available

MIDIShare is used (providing the MIDIShare System extension is available in the Extensions folder in the System folder).

Use AUTOLINK with SoundDiver or SoundSurfer if available

If you start another program which can communicate via Autolink (e.g. SoundDiver or SoundSurfer) the Autolink connection will be made.

14

Autolink allows:
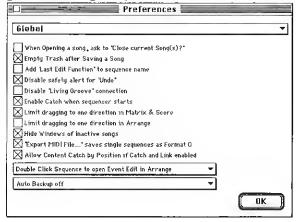
- Sound names of Editor/Librarian programs to be transferred to LOGIC's multi instruments;
- LOGIC's transport functions to be remote-controlled from other programs;
- All Autolink programs access to the MIDI ports.

Allow Song Position Pointer while playing

In accordance with the recommendations in the MIDI spec, the Song Position Pointer is only transmitted when the sequencer is stopped (when this option is turned off). Turning this option on allows LOGIC to transmit the Song Position Pointer over MIDI during playback too (for example in a cycle jump, or when changing song position manually).

Global

This page contains the global presets.

When Opening a song, ask to ´Close current Song(s)?´

Whenever you load a new song before closing the old one, a dialog box appears asking whether the current song should be closed. If this checkbox is not checked, you will not even be consulted!

Empty Trash whenever Saving a Song

After saving a song LOGIC's internal Trash is emptied (containing the deleted arrange objects). The saved song still contains the trash. If the checkbox is not checked, the song's Trash can only be emptied by selecting **Structure > Trash > Empty Trash**.

Add 'Last Edit Function' to sequence name

After performing any edit operation (e.g. cutting), the description of the edit operation is added to the name of the arrange object (or resulting objects).

Disable safety alert for 'Undo'

This means that no safety alert appears when you call up the undo function.

Disable 'Living Groove' connection

This breaks the "living connection" between a sequence and a quantization template derived from it. If the sequence is edited, this has no effect on the quantization template. If there is no check in the checkbox, editing the original sequence will also alter the quantization template, which will in turn affect all sequences that are quantized to that template.

Enable Catch when sequencer starts

Every time you start the sequencer (start or pause), the catch function is automatically switched on in all windows (see page 4 - 15).

Limit dragging to one direction in Matrix and Score

In the Matrix or Score Editors you can only move notes in one direction. This means that a note may be either transposed or moved in time, but not both. This prevents you accidentally altering the other parameter.

Limit dragging to one direction in Arrange

This restricts the direction you can move sequences and folders in the Arrange window, in a similar way to and for the same reasons as the option above.

Hide Windows of inactive songs

Only the windows of active songs are displayed. All other song windows currently in memory are hidden. In this mode, you have to use the main Windows menu to switch between songs.

'Export MIDI File...' saves single Sequences as Format 0

If only one sequence is selected when you choose File > Export MIDI File the contents of the sequence are saved in MIDI file format 0. This file format is guaranteed to be compatible with every MIDI file player (see also page 15 - 5).

Allow Content Catch by Position if Catch and Link enabled

If the catch and content catch functions are active, the contents of the sequence at the current song position is what is shown. If there is no check in the checkbox, the window view still follows the song position

14

within the displayed sequence, but does not update to show the contents of subsequent sequences when they become the current sequence (see page 4 - 16).

Double-click on Sequence to open ... Edit in Arrange
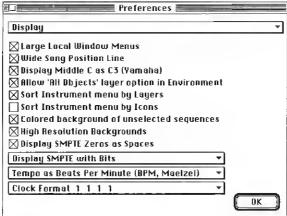
This pull-down menu is where you select which Editor opens when you double-click on a sequence.

Auto Backup ...

This pull-down menu switches on and controls the automatic backup function (see the section *Automatic Backup Files* on page 4 - 32).

Display

This page contains various display options.

```
┌─────────────────────────────────────────────────────┐
│ ▤□▤▤▤▤▤▤▤▤▤═ Preferences ═▤▤▤▤▤▤▤▤▤ │
│ ┌─────────────────────────────────────────────────┐ │
│ │ Display                                       ▼ │ │
│ └─────────────────────────────────────────────────┘ │
│   ☒ Large Local Window Menus                         │
│   ☒ Wide Song Position Line                          │
│   ☒ Display Middle C as C3 (Yamaha)                  │
│   ☒ Allow 'All Objects' layer option in Environment  │
│   ☒ Sort Instrument menu by Layers                   │
│   ☐ Sort Instrument menu by Icons                    │
│   ☒ Colored background of unselected sequences       │
│   ☒ High Resolution Backgrounds                      │
│   ☒ Display SMPTE Zeros as Spaces                    │
│   ┌─────────────────────────────────────────────┐   │
│   │ Display SMPTE with Bits                   ▼ │   │
│   ├─────────────────────────────────────────────┤   │
│   │ Tempo as Beats Per Minute (BPM, Maelzel)  ▼ │   │
│   ├─────────────────────────────────────────────┤   │
│   │ Clock Format  1  1  1  1                  ▼ │   │
│   └─────────────────────────────────────────────┘   │
│                                    ┌──────────┐      │
│                                    │    OK    │      │
│                                    └──────────┘      │
└─────────────────────────────────────────────────────┘
```

Large Local Window Menus

The title and items of the local menus are displayed using the normal System font. If the checkbox is not checked, a smaller font is used instead.

Wide Song Position Line

The song position line is made thicker.

Display Middle C as C3 (Yamaha)

This option affects the description of notes in the editors.Bottom C on a five-octave keyboard (note # 36) is called C1 and middle C (#60 or c´) is called C3. According to this method of counting the lowest MIDI

note (# 0) is called C-2. This is the official standard and is usedby most manufacturers.

If there is no check in the checkbox, bottom C on a five-octave keyboard is called C2 and middle C is called C4. Using this method of counting the lowest MIDI note is C-1.

Allow 'All Objects' layer option in Environment

You can choose the top item in the pull-down Layer menu (All Objects). If there is no check in the checkbox this item is hidden.

Sort Instrument Menu by Layers

The instruments in the pull-down instrument menu are sorted by layers.

Sort Instrument menu by Icons

The instruments in the pull-down instrument menu are sorted by the internal index number of the icons.

Colored background of unselected sequences

Sequences appear in the color chosen for them; the name is in black. If the checkbox is not checked, sequences are colored gray and the name is in the chosen color. In both cases, sequences which are selected are displayed in inverted colors.

High Resolution Backgrounds

In the Arrange and Matrix windows, a custom Emagic background pattern is used (as far as the screen resolution allows). With slower computers, the screen redraw rate can be slightly sluggish. If there is no check in the checkbox, a standard gray background is used instead. Both backgrounds are only visible if you have not chosen a white background in the View menu.

Display SMPTE Zeros as Spaces

In SMPTE times that start with zeros, the zeros will be represented by spaces if this option is selected.

SMPTE Display

This pull-down menu can be used to set the following options for the SMPTE time display:

Display SMPTE with Bits: subframes (SMPTE bits 0-79) are shown.

Display SMPTE without Bits: subframes are not shown.

Display SMPTE with Quarter Frames: quarter frames are shown.

14

SMPTE as Feet & Frames, 35mm film: the display is given in feet and frames for 35mm film.

SMPTE as Feet & Frames, 16mm film: the display is given in feet and frames for 16mm film.

Tempo Display

This pull-down menu can be used to set the following options for the tempo display:

Tempo as Beats Per Minute (BPM): beats per minute with four individually adjustable decimal places.

Tempo as BPM without Decimals: beats per minute with no decimal places.

Tempo as Frames Per Click with Eights: frames per beat with eighths. After the value comes *fpc*.
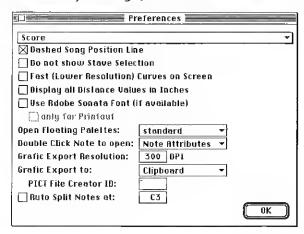
Tempo as Frames Per Click with Decimals: frames per beat with four decimal places. Take care: this display can easily be confused with the BPM display!

Clock Format

This pull-down menu offers various format options for the song position display (see page 5 - 4).

Score

This page of the Preferences can also be reached via the Score window's local menu by selecting **Options > Score Preferences...** .

Dashed Song Position Line

The song position line in the Score Editor is dashed; when there is no check in the checkbox the line is solid.

Do not show Stave selection

All staves are always black. If there is no check in the checkbox the selected stave will be black and all the others will be gray.

Fast (lower resolution) curves on screen

The screen redraw rate is accelerated by a slightly coarser display of braces and slurs.

Display all Distance Values in Inches

The units of the rulers (**View > Page Rulers**) in the whole page view and the edge settings are given in inches instead of in centimeters. You can also directly switch length units by clicking on a description in the ruler or via the relevant input fields.

Use Adobe Sonata Font (if available)

The Adobe Sonata font is used for screen display and printing. It should be placed in the "Fonts" folder of the System folder. This font is not supplied with the Macintosh but can be obtainedfrom Adobe.

For Printout Only

The Sonata font is used for printing only. LOGIC's own font is used for the screen display to accelerate the screen redrawing (but only if there is a check in the previous checkbox).

Open Floating Palettes

Floating palettes can be opened in various different formats (horizontal, vertical or standard), and are opened by double-clicking on the part box. Palettes already open in othe r screensets are not affected by new ones you open. You can change the format of the floating palettes you open at any time, irrespective of the setting here, by using the modifier keys (see page 12 - 19).

Double-click on note to Open

This page lets you set which dialog box or editor will be opened when you double-click on a note.

If this option is set to *Note Attributes*, you can open the Event List by holding down the 🔳 keys and double-clicking. If you have set up one of the editors to be opened from here, you can open the Note Attributes dialog box by holding down the 🔳 keys and double-clicking.

14

When you double-click on a note to open an editor, LOGIC checks to see if the window you're trying to open is already open, and if so, it simply brings it to the foreground.

Graphic Export

This option controls the operational parameters for the use of the Camera tool in the Score editor, which allows you to export a section of score of your choice as a bitmapped image in PICT format.

The Graphic Resolution option determines — unsurprisingly — the resolution of the exported image in dots per inch (dpi).

Graphic Export To determines whether the image is to be exported to the Clipboard or as a stand-alone file.

When exporting as a file, a file selection box appears after you've used the Camera tool in the Score window, so you can enter the name of the file you're creating. The PICT File Creator ID allows you to determine which program will be opened to read the file when you double-click on it (the file, that is). The program ResEdit lets you display files' 4-figure Creator ID if you select »File > Get File/Folder Info«.

Auto Split Notes at
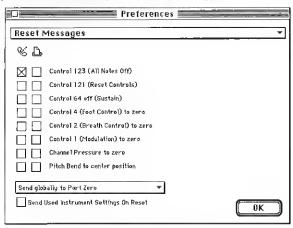
When recording instruments with Score Styles that use different MIDI channels for each stave, this option allows you to set a split point, so that the notes will be correctly distributed to the staves while recording, by changing the MIDI channels of the recorded notes in the appropriate manner. If there are any, the MIDI channel for the Sustain Pedal events (Controller #64) will be altered so that the Pedal symbols appear beneath the lowest staff.

If the instrument on the recording track is not assigned to a polyphonic Score Style or Mapped Drum style, this parameter will have no effect on anything.

Reset Messages

This is where you define which controllers are sent as a reset message to the printer and modem ports (set separately). .

With an MTP or MTP Emulation interface, the bottom pull-down menu should be set to *Send globally to Port Zero*. If the reset commands do not work due to a faulty MTP Emulation you should use *Send individually to each port*.

When are Reset Messages transmitted?   Note

A MIDI Reset is transmitted when:

- the sequencer is halted by pressing Stop twice in quick succession;
- you click on the MIDI Out display in the Transport window;
- you make use of the calmly-named Full Panic key command (usually (*help*));
- or automatically when a new Song is opened or activated (irrespective of the chase settings — see the section *Send MIDI Reset before Chasing* on page 14 - 10).

Smart Reset

The reset has been optimised for use with the following controllers to minimise data congestion at cycle jumps or when the sequencer is stopped:

1. Pitch Bend
2. Channel Pressure
3. Modulation wheel (Control #1)
4. Sustain Pedal (Control #64)

14

LOGIC handles these messages separately for each instrument and each MIDI channel. As soon as LOGIC is halted or its position altered, the above MIDI messages will be transmitted to the relevant instruments, and no others. For example; if a particular instrument has received no pitch bend data, then no pitch bend reset is sent to that instrument. Even better: if the instrument has received pitch bend data, but the last pitch bend event happens to have been at zero bend, again, no pitch bend reset will be transmitted. All this helps cut down on unnecessary MIDI data flying around your system.

A "Power user" tip:

Generally speaking, the 'Smart reset' feature improves the all-round timing of your system considerably. There are a few exceptions to this rule, however, which will crop up if one or more of the above-named MIDI messages are assigned to non-standard uses.

For example, if you are automating a mixer console, and assign MIDI Controller #64 to EQ gain, Smart Reset could prove to be a bad idea, because every time you stop the sequencer, the EQ gain will be reduced to 0.

There are two possible solutions to this problem:

1. You could avoid using the Smart Reset MIDI controllers for non-standard MIDI applications. There are sufficient Controllers between #1 and #64 to be able to use another without any conflict arising, in most cases, at any rate.

2. The other alternative is to switch off reset messages for certain instruments. This is done by switching on the *No Reset* parameter in the Instrument Parameter box of any standard instrument, mapped instrument or sub-channel of a multi-instrument.

Tip
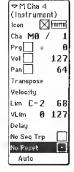
Resets are only transmitted to those instruments used in the Arrange window. If you want to use Smart Resets on other Environment objects (for example a fader), you will have to insert an instrument into the Data flow:

1. Create a standard instrument, and activate the "No Reset" checkbox. Connect the instrument output to the Environment object you wish to use.
2. Select the newly-created instrument as the track instrument.

Send Used Instrument Settings On Reset

When this option is switched on, all currently-used instrument parameters will be transmitted whenever a MIDI Reset occurs.

OMS Preferences

OMS functions are described in full in the section *The Environment and OMS* on page 7 - 61.

Compatibility

This section is about adapting LOGIC to your computer.

Timer Model

To achieve the best possible timing resuts, please choose the *New Phase Control Timer Model.* The MIDI output will then have the best performance (minimum Jitter, maximum phase coherence) that is technical possible. From a musical point of view this means that even the smallest timing nuances in will be audible. At the same time, the processor ressources are optimized; one obvious advantage being that screen redraw will be accelerated dramatically on slower machines.

Sorry, the new phase control timer is currently not available for the Yamaha CBX hardware (LOGIC Audio).

The Phase Control Timer is new in version 2.6. In case any problems occur, you can switch back to the old timer model with the flipmenu.

It is not possible to control the Phase Control Timer with the second parameter of the Global Tempo Correction (see below). However, this is not necessary because the new timer doesn't vary between different computer models.

The old timer model is available in two resolutions. Please choose – if possible – high resolution. Only change to medium resolution if the screen redraw is unbearably slow .

Smooth Cycle Algorithm

This improves the timing of cycle jumps so you can set the length of sample loops in cycle mode. If your computer has a very slow CPU, this setting reduces its processing performance for graphics. In general, you'll want to keep this on whenever possible if you're working in a style which involves frequent cycling of sections of music.

Faster Animation

Moving graphics like the running song position line are updated more often. This can occasionally cause compatibility problems withother programs that are running simultaneously. If this happens, you should deactivate this checkbox.

14

Global Tempo Correction

Activates the tempo correction function. Here you can enter a tempo correction value in percent to four decimal places.

Warning!   You should only use this option if you know what you are doing.If you're not synchronizing a second sequencing system via SMPTE, always deactivate the tempo correction.

When you first boot up LOGIC, it is calibrated to your computer by means of an extremely precise tempo calculation. However, if you are synchronizing several systems via SMPTE time code, each system has to independently calculate the bar position from the time position. This can mean that different sequencing systems on different computers can arrive at slightly different tempos. This function is used to compensate for any such differences. Positive values make LOGIC's internal tempos faster (although the tempo display is unaltered).

After the »Global Tempo Correction« parameter, there is another number which you can use to change your Macintosh's **internal Timer.** This doesn't just affect the tempo scale generally, but also the speed of the MTC transmitted when in internal sync mode.

If you are using LOGIC Audio, you *must* use the **Options > Calibrate to Internal Hardware** function in the Audio window straight after altering the internal timing value!

Changes made to the internal timing always have an effect, even if the "Global Tempo Correction" checkbox is switched off!

This function could be useful if you wish to play songs back on different computers, and notice a difference in the internal clocks. You could then match up the songs containing particularly long audio regions.

Chapter 15
File Transfer

15.1   LOGIC Songs on Other Platforms

LOGIC is currently available for the following types of computer:

- Apple Macintoshes
- Apple Power Macintoshes
- PC-compatible computers running Windows 95
- Atari ST, TT and Falcon

All LOGIC versions on all the various computer platforms are fully cross-compatible. However, make sure you are using the latest program versions (see the section *Different Program Versions* on page 15 - 2).

Disk Formats
Before you exchange song files between different computer platforms you have to choose a disk format which can be read by both the computers. For all the above-named types of computer this is the **MS-DOS format**.

The "PC Exchange" control panel which is supplied with Macintosh System 7.5 onwards allows you to read, write and format disks in MS-DOS format. You can do the same thing with the "Access PC" control panel made by Insignia Solutions or the "DOS Mounter" system expansion from Dayna. Less convenient (but just as effective) is the "File Conversion" program supplied with older versions of the operating system. "Mac-PC Manager" by Software Architects Inc. can even mount PC formatted harddisks.

Transfer
The transfer process itself is very straightforward:

- Format a disk in the MS-DOS format,
- Save the song onto this disk from the source computer, and
- Load the song from the disk into the destination computer.

15

Special Features of the Atari ST

When transferring to (and from) the Atari ST, remember to use DD disks, because STs cannot read HD disks.

Special Features of the Macintosh

When transferring from the Macintosh to other platforms make sure that the file name complies with DOS conventions (maximum 8 characters). When transferring to PCs add the extension ».LSO« to the song file name – and when transferring to the Atari add the extension ».LOG«.

Different Program Versions

If you want to transfer song files between different old versions of LOGIC the rules are as follows:

Newer program versions can always read the song files from older versions.

Older program versions can only read the songs from newer versions if the data format has not been altered. However, because the program is being constantly developed this does happen from time to time.

Here's some more concrete guidance:

If you have created songs in LOGIC 2.0 which contain cable switchers in the Environment, you may find in some cases that these switchers turn into meta event faders in version 2.5, and no longer fulfil their function correctly. This problem is easily fixed, however:

- Select all the cable switchers in your Environment;
- Give them the value 48 as the output definition under -1-. The channel number is irrelevant here.
- Check whether this change has done the trick by the appearance of the switchers: those that are switched to AutoS tyle should appear as switchers again in the display, and will function as originally.

15.2 Files from other Programs

To help you to transfer to LOGIC from other sequencing programs and allow you to keep using your old songs, LOGIC is able to read data from other programs.

If you choose **File > Open** only LOGIC songs appear in the file selection box. However, if you choose **File > Import** all the files in the current directory are automatically searched to see if they can be read. Readable files are recognized even if you haven't assigned the DOS suffix to the Macintosh document type in "PC Exchange". In other words, you don't need to worry about specifying any file type.

microLOGIC Songs

This is an easy task, because microLogic is a subset of LOGIC.

Notator SL Songs

Before you import Notator songs you should make the following preparations in Notator SL:

- Some SL playback parameters, like mutes, cannot be converted by LOGIC. You should therefore delete any sequences that you don't need.
- LOGIC cannot directly read Notator SL's tempo events. Thus if your song contains tempo changes you must first create a sync reference in Notator SL's SMPTE window.

You will find more information on these points in the SL manual.

Transfer
- Format a DD disk in DOS format.
- Save a prepared Notator SL song onto the disk.
- Load the SL song into LOGIC by choosing **File > Import**.

Depending on the structure of the imported song, LOGIC sometimes has to reorganize the storage structure and begin the loading operation from scratch. This is completely normal and is done to avoid wasting memory.

When the Notator SL song is loaded it is recreated as a new LOGIC song. The arrange levels a to d are turned into four folder tracks. Each of the individual folders represents a pattern with 16 tracks. The order of the folders corresponds to the order of the patterns in the Arrange List.

The ports are converted as follows:

A -   Modem port 1

E -   Modem port 2

15

F -	Modem port 3
G/B -	Modem port 4
H/C -	Modem port 5
I/D -	Modem port 6

Cubase™ Files

("Cubase" is a trademark of Steinberg GmbH) LOGIC can load Cubase files in both the song and arrangement formats.

Cubase songs (with the correct Macintosh file type: scSG) can also be loaded using **File > Open**. If the Cubase songs are from another computer platform they must be assigned the >.ALL< DOS suffix and the >scSG< document type in PC Exchange.

For the sake of simplicity you can use **File > Import** instead. The Cubase "Song" and "Arrangement" formats are automatically recognized and loaded (even by Atari or Windows computers, see page 15 - 1).

The following Cubase data are imported:

- All MIDI events (channel and Sysex messages).
- Parts become sequences and ghost copies become aliases.
- The settings in the instrument list are turned into instruments with the correct name, MIDI channel and output.
- Tracks are assigned suitable instruments.
- Drum tracks become tracks of a mapped instrument.
- The drum map is used to define the mapped instrument.
- The names, assignments and note layouts of the tracks, parts, ghost copies, instruments and mapped instrument input notes are adopted.
- Tempo and tempo changes.
- Time signature and time changes.
- Cubase MIDI mixer objects are turned into fader objects with the correct position and MIDI definition.

At present, mixer objects still have to be cabled manually. Refer to the attached Readme files.

LOGIC deals with the drum map in exactly the same way as Cubase. When loading a song the drum map is imported and when loading an arrangement an existing mapped instrument is used. If none is available, a mapped instrument with a predefined GM drum allocation is used instead.

For technical reasons, it is possible that a Cubase file may not be loaded correctly or that some parameters or other data will not be loaded the same way as in Cubase. We reserve the right to alter this function without notice or remove it completely.

15.3   MIDI Files

MIDI files are not specific to particular sequencer programs or types of computer. They contain the following information:

*   MIDI events with their time positions and channel assignments;
*   Names of individual tracks;
*   Names and positions of markers;
*   Tempo changes;
*   Copyright marks.

LOGIC supports the import and export of MIDI file formats 0 and 1:

*   Format 0 can only contain one track,
*   Format 1 can contain several tracks.

Neither format recognizes any structuring of a track, eg. into several sequences.

Loading MIDI Files

To load a MIDI file (eg. a purchased song arrangement) choose **File > Import**. This creates a new song.

If there is already a song in the memory you will be asked "Create new environment or copy current environment for MIDI File? New/Copy". If you click *Copy* the existing environment is copied. The tracks of the MIDI files are automatically assigned to suitable instruments.

If there is no song in the memory or you answer the above question by clicking *New*, the predefined environment for new songs is used instead.

Copyright
The copyright mark is read as text.

Bank Select
When you open MIDI files, program change and controller events at the same position are moved by one tick, so that they remain in their

15

original order. This prevents LOGIC's from optimizing the transmission order of the events and changing it, and the reason for wanting to do this is that certain sound modules or synths react sensitively to program change and bank select events that have been swapped around.

Note   This guarantees that there will be no timing problems, because the transmission of an event via MIDI always lasts longer than 1 tick!

Saving MIDI Files

If you want to play a song on another sequencer (eg. a hardware sequencer) you can save it as a MIDI file. Consult the sequencer's instruction manual to see which MIDI file formats it can read. All devices should be able to interpret at least the 0 file format.

Preparing the Song

Because of the limitations of the MIDI file format you should make the following preparations:

- Neutralize all playback parameters with the normalize function (select them all by pressing ⌘Ⓐ, then choose **Functions > Sequence/Instrument Parameters > Normalize Sequence Parameters**),
- Convert all playback quantization with the fix quantize function (⌘Ⓐ, **Functions > Sequence/Instrument Parameters > Fix Quantize**),
- Convert all aliases into real copies (⌘Ⓐ, **Structure > Alias > Turn to real copy**),
- Convert all loops into real copies (⌘Ⓐ, **Functions > Sequence/Instrument Parameters > Turn Loops to Real Copies**),
- Convert all sequences track by track into a continuous sequence (⌘Ⓐ, **Structure > Merge > Objects per Track**). Answer the "Convert multiple Event MIDI Channels to Instrument MIDI Channel? No/Convert" dialog box with ⏎ or **Convert**.

Additional preparations for file format 0

Since in format 0 only one sequence can be saved, you also have to merge all sequences into one (⌘Ⓐ, **Structure > Merge Objects**).

Saving a Song as a MIDI File

Select all the required sequences and choose **File > Export MIDI File...** . You can now enter the destination directory. Remember that hardware sequencers can usually only read MS-DOS disks.

In File Format 0

See whether the *"Export MIDI File..." saves single Sequences as File Format 0* checkbox (**Preferences > Global**) is checked. If it is, choosing **File > Export MIDI File...** when only one sequence is selected means that file format 0 will be automatically created.

15

Chapter 16
Tempo and Synchronization

16.1 Tempo

Tempo Display

If your song has a tempo that stays the same throughout, you can set this constant tempo in the Transport window.

The current tempo will always be displayed here, even if you are using programmed tempo changes or external synchronization.

You can set the tempo display format from the **Preferences > Display** page (see page 14 - 30).

Tempo Track

Tempo changes are controlled by tempo events, which are stored in a special tempo track. This track is not visible in the Arrange window.

The tempo track applies to the whole song. For details on creating polyrhythmic and polymetric structures, please refer to the section *Polyrhythms* on page 17 - 4. To find out more about changing the tempo of individual sequences, please read the section *...by time-compressing or -expanding the contents* on page 6 - 14.

The tempo track also determines the relationship between incoming time code and the current song position (see page 16 - 27).

16

Overview

Where to find information on the various ways of changing song tempo

The easiest way to set **individual tempo changes** is from the Tempo List (see page 16 - 3). The Tempo List is a specialized Event List editor for tempo events.

LOGIC offers a simple way of creating **accelerandi** or **ritardandi** (steadily increasing or decreasing tempos): try using the *Create Tempo Curve* feature (see page 16 - 6). Alternatively, you can record tempo changes with the mouse from the Transport window (see page 16 - 12) or more accurately using the Graphic Tempo editor (see page 16 - 4). The Graphic Tempo editor is a hyper editor with a fixed event definition for tempo events, and is really useful for editing **existing tempo changes** by hand (see page 16 - 4).

You can also effect **tempo changes via a MIDI controller message** (and thereby record these changes), with the help of the real-time Tempo fader (for more about this, read the section *The real-time Tempo Fader* on page 16 - 10).

If you want to change the **basic tempo of a song** which already contains tempo changes, the function to use is *Scale Existing Tempo Changes*, in the Tempo Operations window (see page 16 - 7). This is a special transform window for tempo events.

For more on **setting tempos manually** (by inputting MIDI notes rhythmically throughout the song — so-called "Human Sync"), please read the section *Tempo Interpreter (Manual Sync)* on page 16 - 8.

You can also record a solo performance without a metronome and then **create a tempo track that fits after the recording.** This enables you -- to take just two examples — to quantize accompaniment arrangements or create a readable score. Such post-recording tempo track creation is carried out using the reclock function (for more on this, read the section *Setting the Tempo After Recording (Reclock Song)* on page 16 - 12).

The Tempo Operations windows contains a few other functions: for example for **stretching/compressing an existing Tempo curve** (read the section *Stretch Existing Tempo Curve* on page 16 - 8); or for **replacing a passage containing several small variations in tempo with one at the average of these tempos** (check out the section *Create Constant Tempo* on page 16 - 7).

Logic
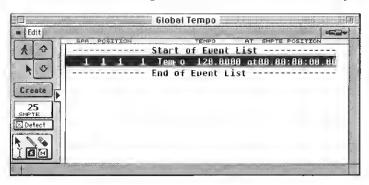
For more on how to **copy the tempo changes from a passage of a song**, read the not-unobviously-entitled section *Copying The Tempo Changes from a Passage* on page 16 - 4.

To find out **how to fix a particular bar of a song to a particular SMPTE time frame** (for all of you out there who are using LOGIC to synchronize music to picture), read the section *Positioning Bars at specific Frames* on page 16 - 31.

Tempo List Editor

You can open the Tempo List by clicking and holding on the Transport's Sync button with the mouse. A pull-down menu will appear , from which you need to **Open Tempo List**... Alternatively, you can simply select **Options > Tempo (Sync Reference) > List Editor**.The layout

and way you use the Tempo List are very similar to those of the Event List (see page 9 - 1).

Creating Tempo Changes

• Set the song position at the required point.

• Click *Create*.

A tempo event appears showing the current tempo. You can alter the tempo in the tempo column.

Alternatively, with the pencil tool selected, click on the word "Tempo" on an existing tempo event. A new tempo event appears with an input box for the position. Enter the required bar position and press ⏎.

16

Copying The Tempo Changes from a Passage

- Set the locators to the passage containing the correct tempo change.

- Choose **Edit > Select Inside Locators**.

- Copy the tempo events onto the clipboard (⌘Ⓒ).

- Deselect all tempo events (by clicking *Start/End of Eventlist* or the background).

- Paste the tempo events from the clipboard (⌘Ⓥ).

- A position input box appears at the first tempo event where you can alter the bar position. If the first tempo change is not at the start of the bar in the passage, be sure to alter the number of the bar and leave the "fractional values" unaltered.

- Press ⏎. The copied tempo changes are selected, and you can undo the operation if necessary.

Deleting Tempo Changes

You can delete tempo events by clicking them with the eraser or pressing the ⌫ key.

Other Functions

The entries in the tempo list interact and affect each other. For details please refer to the section *Positioning Bars at specific Frames* on page 16 - 31. You can also make several synchronization settings here. All other functions are identical to those in the Event List (see page 9 - 1).
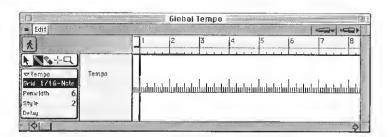
You can move any selected tempo event to the current song position using the key command *Pickup Clock.*

The Graphic Tempo Editor

The Graphic Tempo editor is a Hyper editor, but allows no changing of the event definition for tempo events.
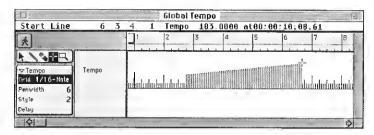
To open the Graphic Tempo editor, grab the Sync button in the transport panel and choose **Open Graphic Tempo…** from the pull-down menu. Alternatively, select **Options > Tempo (Sync Reference) > Graphic Editor**.

Creating Continuous Tempo Changes

*   Choose the Crosshair tool.

*   Click on the required section in the working area and hold down the mouse button.

*   Keep an eye on the info line at the top of the window which tells you the exact position and tempo. Set the start (or end) of the tempo change.

*   Release the mouse button.

*   Now set the end (or start) of the tempo change. If you want to create new tempo events (instead of altering existing ones) hold down the ⌦ key.

*   Press the mouse button.

Remember that the time width of the added tempo events depends on the setting of the *Grid* parameter.

In most cases, the 1/16 note setting is enough to create the impression of a continuous tempo change.

Other Functions

The operation and other functions are identical to those of the Hyper editor (see page 10 - 1).
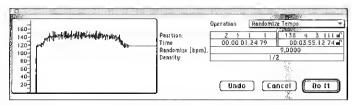
Tempo Operations

The Tempo Operations window is used to edit existing tempo changes, as well as to create new ones. The window automatically displays the area you've selected for editing, and as the tempo curve is processed, the changes are displayed graphically in real-time, so you can see what's happening. The displayed tempo curve (which is calculated from the tempo settings you've made) is shown in red, or as a dotted line on black and white monitors).

Opening the Tempo Operations window

The Tempo Operations window can be opened either from the Arrange window via **Options > Tempo (Sync Reference) > Operations**, from the Transport via the Sync button's pull-down menu, or by means of the key command *Open Tempo Operations*.
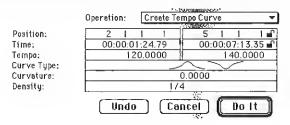
The different functions (or »operations«) offer you various interesting possibilities for editing tempo changes and the sync reference. The lock symbol lets you fix certain parameters so they don't change.

Create Tempo Curve

This function lets you create a lot of tempo changes with just a few parameters, and gives you a smooth overall change in tempo.

Three kinds of tempo curves are available from the *Curve Type* pull-down menu. Each of these classes has a *Curvature* parameter, which lets you determine whether the tempo should speed up or slow down, depending on whether you enter positive or negative curvature values.

Logᔰc

- Select the *Curve Type* you want.

- Use the *Position* or *Time* settings to determine the region over which the tempo change should extend: left is the start point, right the end point.

- Enter the start and end tempos you want in the *Tempo* line.

- Finally, set the *Curvoture*, and check out the graphics as the tempo changes .

The concentration of the tempo events created graphically can be altered using the *Density* parameter. Values of 1/8 and finer should only be used if really necessary (for example with very slow tempos and fast tempo changes). Even finer settings (1/16 und 1/32) can be entered by holding down the ⌥ keys.

Don't select a resolution higher than 1/8 or finer just to make the curve look smoother.   Tip

Create Constant Tempo

Operation:	Create Constant Tempo ▼	
Position:	2 1 1 1	5 1 1 1🔒
Time:	00:00:01:24.79	00:00:07:13.35🔒
Tempo:	130.0000	

This function creates a constant tempo in any area you select. The default setting imposes the average tempo for the selected region.

If you want to remove all variations in tempo between two points without changing the SMPTE time for the right-most position, just click *Do It*.

Scale Existing Tempo Changes

Operation:	Scale Existing Tempo Changes ▼	
Position:	2 1 1 1	5 1 1 1🔓
Time:	00:00:01:24.79	00:00:07:13.28🔓
Scale [%]:	8.0000	
Average Tempo:	130.0930	

16

With this handy function, you can change existing tempo changes proportionally, or **scale** them. This lets you speed up an entire part of a song, without losing the relationships between any further tempo

changes within that region. You carry out the scaling in percent. Positive percentage values speed up sections, and negative ones slow them down.

Stretch Existing Tempo Curve

Operation:	Stretch Existing Tempo Curve							
Position:	2	1	1	1	5	1	1	1
Time:	00:00:01:24.79				00:00:07:24.34			
New End Position:					5	2	3	173
New End Time:	00:00:08:20.27							
Stretch [%]:	14.0000							

The Stretch function lets you stretch or compress an existing tempo curve. The *Position* or *Time* values let you define the start point of the region you want to change; you then enter either the new end point of the tempo curve as a bar position or SMPTE value, or set a *Stretch* value for the curve (in percent).

Tempo Interpreter (Manual Sync)

The computer keyboard and/or incoming MIDI events can be used to set the sequencer tempo. Put another way: LOGIC allows manual synchronization (the so-called "Human Sync").

To do this, the key command *Tap Tempo* must be assigned to a particular key (any one you like) or to a particular MIDI event from the Key Commands window.

The sync is fairly loose; in other words, if the manual sync impulses stop coming in, the sequencer continues at the last tempo it received.

If you have a Mark Of The Unicorn interface (a MIDI Time Piece or MIDI Express) you can convert percussive audio signals into MIDI notes. This feature lets you use (say) a bass drum track (either live or from tape) to control LOGIC's tempo. You determine which MIDI notes will be generated by the incoming audio signal from the control panel supplied with your interface. For more on how to do this, check out the MOTU documentation.

Switching to manual sync

You can get into manual sync mode in the following ways:
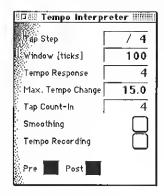
- manually via the Sync menu;
- automatically in auto sync mode, if LOGIC encounters a *Tap Tempo* command.

The parameters for controlling LOGIC´s reaction to tap tempo commands can be found in the Tempo Interpreter window.

Opening the Tempo Interpreter

The Tempo Interpreter can either be opened from the Sync button's pull-down menu on the Transport, or by using the key command *Open Tempo Interpreter*, or from the Arrange window by selecting **Options > Tempo (Sync Reference) > Interpreter**.

```
┌─────────────────────────────┐
│ ▫ ▦  Tempo Interpreter  ▦▦▦ │
├─────────────────────────────┤
│  Tap Step            ⌐ / 4 ⌐│
│  Window [ticks]      ⌐ 100 ⌐│
│  Tempo Response      ⌐   4 ⌐│
│  Max. Tempo Change   ⌐15.0 ⌐│
│  Tap Count-In        ⌐   4 ⌐│
│  Smoothing            ☐      │
│  Tempo Recording      ☐      │
│                              │
│  Pre  ■    Post ■            │
└─────────────────────────────┘
```

Tap Step

Sets the note value that the manual taps will be describing. The best results are obtained when using larger values rather than smaller ones. Suggested value: *1/4 note.*

Window

This sets the size of the time region displayed in the window in which the tempo-determining tap notes will be entered (the size of the window is set in ticks, ie .1/3840 note). Only taps made within this window are used to determine the tempo; any taps outside it are ignored.

The narrower the window, the more effectively LOGIC will be able to withstand the influence on the tempo of any taps that fall between the "official" note values (as set with the **Tap Step** parameter).

The larger the window gets, the more it will be possible to effect more drastic tempo changes.

If you set the window parameter to *0*, the tap window will disappear altogether and all taps will be accepted as tempo-determining information. The sequencer will also come to a halt if taps stop being generated.

16

Tempo Response

This sets the sensitivity for tempo changes: the larger the value, the greater the sensitivity. Suggested value: *4*.

If the tap timing is imprecise, but LOGIC is supposed to be playing at a constant tempo, reduce this value to (say) *2*.

Max Tempo Change

This sets the maximum tempo change possible per tap (in bpm). In other words, the tempo will only be able to change by a maximum value of bpm for each tap — and that maximum value is what you put in here. To obtain as regular a tempo curve as possible, follow this rule: set as small a value as possible (and only as large as necessary).

Tap Count-In

This sets the number of taps in the count-in. LOGIC then starts on the tap *after* this number of taps has been counted out.

Smoothing

Switching on this function (by means of the dark button) smooths out leaps in tempo in the taps being input (which could prove useful when using LOGIC live). You need to switch it off (with the lighter button) if you want the sequencer's tempo to follow your taps as precisely and quickly as possible.

Tempo Recording

The »Tempo Recording« function creates a tempo list in record mode to follow your taps. This function should normally be switched off (with the lighter button).

Pre and Post

These are the ways your tap signals are displayed:

Pre: displays every tap that is input;

Post: displays every *accepted* Tap, ie. each tap that occurs within the tap window (as defined above) on or around a tap step (again, as defined above).
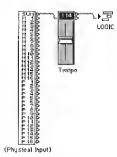
The real-time Tempo Fader

You can create a real-time Tempo fader in the Environment window by selecting **New > Fader > Special > Tempo Control**. Without needing to connect up this fader to anything, you can then use it to control LOGIC's tempo (using Meta event #100).

The tempo fader has a range of possible values from 50-177 bpm for external MIDI data (unsurprisingly, the corresponding input values are 0-127).

If you place the tempo fader between the physical input and the sequencer input, you will be able to:

*   record tempo changes;
*   control the tempo with any MIDI events you like:

The tempo fader parameter box (shown left) displays Pitch Bend events as the IN-definition (this is the default). This allows you tocontrol LOGIC's tempo from the Pitch Bend wheel.

The Effect On Recording

This way, new data can be recorded for the tempo track "intelligently"; the original tempo data will only be erased in areas where there were tempo changes originally.

The Effect On Playback

If the Tempo fader is moved during playback or recording, all the data defined in the tempo list is switched off until the next time the sequencer is halted.

The Effect on External Sync

The movements of the tempo fader are ignored when external SMPTE sync is in operation.

The tempo fader can therefore be used to deactivate the sync reference during playback or recording if you wish.

Note

Tempo Functions

Recording Tempo Changes

Go to **Song Settings > Recording Options** page and activate the *Allow Tempo Change Recording* checkbox. All tempo alterations which you make during the recording will now be recorded as tempo events on the tempo track. You can then edit them in one of the tempo editors.

Setting the Tempo After Recording (Reclock Song)

You can now record a sequence without using a metronome, and match LOGIC's tempo to the sequence afterwards.

This allows you, for example, to improvise freely, without any tempo restrictions, say at the beginning of a new song. Previously, it would have been difficult to add further accompaniment to this improvised section later, as the improvised part has no relationship to any meter that can be followed by other parts. This problem can now be overcome using the *Reclock Song* feature.

This function creates tempo changes automatically in such a way that the improvised notes can be fitted into a bar pattern that makes sense. What you actually hear played back is not altered by this process, however.

> If you'd like to know how this process works in detail, here goes. The notes are fixed to their absolute time positions, and then the bar pattern is fitted to these by means of one or more tempo changes. Finally, the notes are freed from their absolute fixed positions so they can sit in the newly-imposed bar pattern in the usual way. Got that?

Unfortunately, this process usually requires a bit of tidying up afterwards by hand. For this reason, it's usually better to try and establish a link between what you play and the musical meter as you actually play, if at all possible. In other words, play to the click if you can!

Tip   If this isn't possible, you should first see if you can tap a footswitch at quarter-note intervals as you play your improvised section. If you can, you could then assign the footswitch tap to the Tap Tempo function, and record the tempo changes in your section as you play with the help of the tempo interpreter's tempo recording function.

Only if all this can't be done — *then* it's worth trying out the Reclock function. So, down to business:

There are two ways of using the Reclock function:

Logic
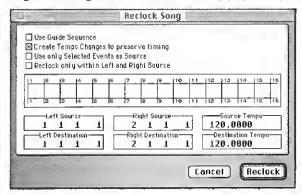
- You apply Reclock directly to the sequence you've played in;
    - Advantage: no guide sequence is needed.
    - Disadvantage: You have to know the precise position (in bars;quite tough to work out for the end note) of two notes, one at the end and one at the beginning of the sequence, as well as the length of the freely-played sequence in bars. Alternatively...

- ...you create an additional guide sequence containing 1/4- or 1/8-notes with the same timing as the freely-played sequence.
    - Disadvantage: You have to record another sequence of the same length as the original (ie. the guide sequence),
    - Advantage: You only have to give the starting position.

We advise using the guide sequence method, because this saves you the hassle of having to enter the exact position parameters of the two guide notes.

The **Functions > Reclock Song...** feature in the Arrange Window is the one used to adapt the song tempo to the freely-played sequence.

- You need to know the number of bars in the recorded sequence and the exact destination bar position of one note right at the beginning and one right at the end of the freely-played sequence.

- The graphics in the middle of the reclock window show the relationship between the old (top) and new bar grids (below).

Left & Right Source

This is where you set the current bar position of the start and end notes in the source sequence. Open an Event List if you want to find out what these are.

16

Left & Right Destinotion

This is where you set the desired bar position (destination position) of the start and end notes.

Creote Tempo Chonges to preserve timing

If this option is checked, a list of tempo changes is created by the Reclock function. If you want a fixed target tempo, do not check this box which registers any timing deviations from the average tempo. If you want the recording to remain unaltered, you have to manually set the *Destinotion Tempo* derived by the function.

Use only Selected Events os Source
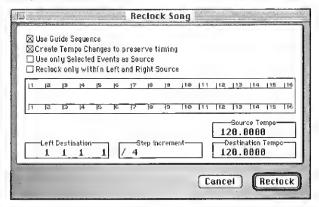
If this option is checked, only the selected events of the source sequence are used as a basis for any tempo changes.

Reclock only within Left ond Right Source

If this box is checked tempo changes are only registered within the set region.

Guide Sequence

If there are a lot of tempo changes in the recorded sequence it is advisable to use a guide sequence. This is another sequence in which you record quarter notes or eighth notes of any pitch in the same meter as the freely-played sequence. Then select the guide sequence before you call up the reclock function.

Use Guide Sequence

You should check this box if the selected sequence is not the source sequence but a recorded guide sequence with constant note values. In this case only the following parameters appear below the bar display:

Left Destination

Where you enter the current position of the desired first beat in the guide sequence.

Step increment

This is where you enter the note value of the beats in the guide sequence.

16.2   Synchronization

The Basics

Synchronization involves ensuring that several devices run absolutely in time with each other. This doesn't just mean that the devices start at the same point and run at the same speed. To set exactly the same speed would require infinite precision (even with digital devices). Instead synchronization means that while the devices are running, *every point* along the time axis of all the devices must be linked.

This requires the devices to be constantly "connected" to each other, which is only possible if one of the devices acts as the "master" by defining the information on the current position while the all other devices act as "slaves" and constantly try to follow this position as closely as possible.

There are two different ways of doing this, depending on the type of devices being used:

1. With devices like sequencers or drum machines, the positional information shared is expressed in bar positions — in other words, they use **bar-referenced synchronization**.

2. Devices like tape machines or hard disk recorders usually use **time-referenced synchronization** — the positional information shared by these devices is time information, in the form of so-called time code. Devices that use time-referenced sync include tape machines for video signals, like VTRs (video tape recorders) and VCRs (video cassette recorders). With time-referenced sync, the tape speed or sampling rate is not dependent on the musical tempo of the recorded song.

    Bar-referenced synchronization is only appropriate if you are using devices from the first category. Where devices from the second category are concerned,

16

time-referenced sync really ought to be used. A single tape machine *could* theoretically control several devices from the first category as amaster device, by playing recorded bar-referenced time code. However, for various reasons, even in this case, professionals would work using time-referenced code: for one thing, only this way do you have the opportunity to sync further machines up to the tape later.

A sequencer synchronized to tape has to calculate the bar position from the time position using its tempo track.

Bar-Referenced Synchronization

First, a quick trip down memory lane...

Pulse Clock and FSK (historical)

The original method of synchronizing analogue sequencers or drum machines to each other was by transferring electrical impulses (clock signals) at specific intervals. The norm was 24 ppqn (pulses per quarter note) which is equivalent to a resolution of 1/96 note. However, some companies used 48 (Korg, Linn), 64 (PPG), 96 (Oberheim) or 384 ppqn (Fairlight). By way of comparison, LOGIC has a resolution of 960 ppqn).

By encoding these impulses as the "shift between two pitches" (FSK code, frequency shift keying) it was possible to record this kind of code onto tape: it was mainly used to synchronize drum machines to tape machines. There were plenty of disadvantages to it, however:

FSK code laid down a fixed tempo.

It was impossible to program intros/outros later.

Both Pulse Clock and FSK had two further disadvantages:

If any impulses were lost through signal dropouts, the synchronized devices would run constantly out of sync from that point onwards.

Because there was no position indicator you always had to start the song from the beginning (FSK 2 or Smart FSK overcame this by encoding the song position as well).

These disadvantages eventually killed off clock and FSK: neither are now used professionally.

MIDI Clock / SPP

With the advent of the MIDI Standard an equivalent to clock impulses was incorporated into the command protocol: *MIDI Clock.* MIDI Clock events are transmitted by the master 24 times per quarter note. To avoid having to start songs from the beginning every time a further MIDI command is also transferred, *song position pointer,* which transmits 1/16 notes from the beginning of the song. Because two data bytes are available for encoding (14 bit), it is possible to distinguish a maximum of 16384 different 1/16 notes or 1024 bars. The slave recog-

nizes the current song position within this region and synchronizes to it.

Modern devices always use a combination of MIDI Clock and song position pointer.

If a sequencing program has a higher timing resolution than 1/96 notes the positions between must be interpolated. The resolution of LOGIC is 1/3840 notes.

Time-Referenced Synchronization

Time-referenced synchronization originates from the field of film synchronization, but nowadays it is also used for audio work. This is why it divides a second not into tenths and hundredths but into frames. One frame was orignally the time it took for a single frame of film (ie. one image) to pass thyrough a film camera or projector.

Unfortunately, the number of frames used per second varies according to country, norm and usage. For film, the international norm is 24 frames per second (fps). American black and white television uses 30 fps. With the introduction of color television, the frame rate of the NTSC norm used in America had to be reduced to 29.97 fps for technical reasons. In Europe, a lower frame rate of 25 fps was used from the start, and with the introduction of color television this was adopted by the European PAL TV standard, as used in Europe today.

> The original reason for the differing film rates, incidentally, derives from the different rates of alternating current used on the different continents (USA: 60Hz, Europe: 50 Hz), which corresponds to the number of half-frames of film passing through a camera/projector per second.

SMPTE/EBU

It was the American Society of Motion Picture and Television Engineers (SMPTE) which first laid down a norm for encoding the individual frames. This designates exactly 80 bits per frame for encoding the hour (0-23), minute, second and frame (frame number within the second). Some of the surplus bits are used to indicate the frame rate, i.e. the number of frames per second. This encoded data stream of 80 bits per frame is known as SMPTE time code. Because the individual bits themselves have a definite time spacing they are also used as a further subdivision of a frame called a "subframe".

This code was adopted without alteration by the European Broadcasting Union (EBU) for use with the European frame rates and renamed "EBU Time Code". In practice this time code is usually referred to as SMPTE time code or just SMPTE (pronounced: "simptee").

16

Drop Frame (df)

One technical problem was the frame rate of 29.97 fps. Only whole frames can be counted but counting up to the 30th frame in every second would cause a deviation between the time code time and the actual time (a difference of about 5.4 seconds for a typical feature film). The solution was the following trick: in every minute 2 frames are left off, but not in minutes that can be divided by 10.

To describe this method, "drop" or "df" is added after the frame rate. Because it is used so often with 30 fps, it is more common to indicate *non-usage* by adding "non drop", "nd" or "ndf" to avoid confusion.

Frame Rates

The SMPTE frame rate must be set the same for all connected devices; you can't have different frame rates in one system. The diagram below shows the various frame rates with the respective duration of a frame or subframe:

Frame Rate [fps]	Frame [ms]	Bit [µs]	Source
24	41.67	520.8	Film
25	40	500	PAL
29.97 drop	33.37	417.1	-
29.97	33.37	417.1	NTSC color
30 drop	33.33	416.7	-
30	33.33	416.7	NTSC S/W

In Europe **25 fps** is used both in the audio field and for synchronizing television or video productions.

American audio productions use mainly **30 fps**.

International audio productions are recorded with 25 fps and 30 fps on different tracks.

LTC / VITC

The 80 bits per frame of the SMPTE time code can be stored in two different forms:

Logic

- As a sound signal on a sound track. This is called longitudinal time code (LTC).

- As a signal in the scanning gap of the video picture. (The complete picture information is transferred slightly quicker than the dura-tion of a frame. There is a short gap while the electronic beam of the cathode ray tube travels from the end of the bottom line back to the beginning of the top line. Because the beam is temporarily switched off, time code transferred during this gap does not inter-fere with the picture.) This is called vertical interval time code (VITC).

LTC is used for all audio productions and often for video synchroniza-tion as well. Tape duplication plants can record LTC onto one of the au-dio tracks, usually track 2. The SMPTE time can also be written onto the picture. Because of the almost universal use of LTC for audio work the term "SMPTE" is used synonymously with it.

MIDI Time Code (MTC)
MTC is a "translation" of the SMPTE bits into the MIDI Standard and contains the time and frame rate information. This requires one status byte and eight data bytes. MTC defines only 24, 25, 30 df and 30 ndf.

Synchronizers
A professional synchronizer is a device which can write and read SMPTE signals. It is connected to a master and one or more slave tape ma-chines and can also control their transport functions.

In computer MIDI interfaces, built-in synchronizers generally have just a SMPTE input and output. SMPTE signals arriving at the input are au-tomatically passed on to the computer by the interface in the form of MTC.

Which device should be the Master, and which the Slave?
As a general rule, the slowest machine should be used as the master to reduce waiting times for the slaves when rewinding or forwarding. Since a sequencer naturally "winds" much faster than even the quickest tape machine, it always acts as the slave.

Synchronization Procedure

Recording SMPTE
If you want to synchronize a computer-based sequencer to a tape ma-chine the first thing to do is record a SMPTE signal onto one of the out-side tracks (the outside tracks on analogue tape machines are of a mar-

16

ginally lower quality because of the (very slight) "fluttering" of the tape, but they are perfectly adequate for time code). Connect the SMPTE out of the interface with the input of the tape machine (or the input of the mixing desk if you want to route the time code and set a level). It is customary to use the track with the highest number. Set the level of the time code to -10 VU. Avoid recording stationary time code by starting the time code generator before the recording. For several reasons — for example to avoid drop-outs which can lead to gaps or jumps in the time code, and to give you the option of extending a song later, say by means of an intro or outro — it is a good idea to record the time code throughout the whole tape (this is known as 'striping' the tape). It is also customary to set a SMPTE code start time of just under one hour (01:00:00:00). The first song on a tape then always begins at exactly one hour. Other tapes of the same project can be given SMPTE times with consecutive hours which means the SMPTE time can be used to clearly identify a tape if the tape boxes get mixed up.

Synchronizing Sequencers to Tape

Connect the output of the time code track to the SMPTE input of the computer. To minimize crosstalk, it is better to make a direct connection rather than routing the signal via the mixing desk. The computer does not have to begin bar 1 at a SMPTE time of 0 hours, 0 minutes, 0 seconds and 0 frames (00:00:00:00). If the second song on tape begins at (say) 01:04:50:00, you need to set a SMPTE offset. This is the SMPTE time at which the sequencer begins bar 1. Make a note of the SMPTE offset on the track sheet for the song or next to the song title on the tape box!

The bar position which is reached at a specific SMPTE time position depends on the tempo of the sequencer. If you have begun to record onto tape you won't be able to alter the tempo without disrupting the synchronization. You should therefore also make a note of the precise tempo on the track sheet.

The SMPTE offset and tempo settings are saved with the song but it is not unheard of for the song file and the tape to be separated.

Synchronizing Several Sequencers

If you want to synchronize several sequencer programs with a tape machine acting as the master you should try at all costs to synchronize just **one** sequencer via SMPTE or MTC! You can then synchronize the other sequencers to this one via MIDI Clock/SPP. When synchronizing several sequencers (with no tape machine) you should only use MIDI clock/SPP. This avoids deviations in the bar position, since otherwise

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every program has to calculate this independently from the time information using its own tempo track.

If you cannot avoid synchronizing several sequencers using SMPTE, e.g. because the distances within the system are too great for MIDI signals, you can even out any deviations in the bar position using *Global Tempo Correction* in the **Preferences > Compatibility** page (see page 14 - 36).

Click Track

It is common practice to record a click track, i.e. a metronome sound, to run throughout any song at the correct tempo, as well as time code. This is partly due to possible deviations in the positional calculation of different sequencers from the recorded SMPTE code. It also allows overdubs in studios without MIDI equipment, although nowadays such studios are few and far between.

When recording a click track or other signal onto the track next to the SMPTE code it is better to set a fairly low record level. Crosstalk from a high-level signal onto the SMPTE track can corrupt the SMPTE track and hamper smooth synchronization.

LOGIC as the Master

If you need to synchronize a second sequencer system or an internally-programmed drum machine to LOGIC, or if you want to make use of an effects unit with a delay algorithm that can be clocked to MIDI to give song tempo-related delays, use MIDI Clock/SPP. If you want to synchronize an external hard disk recorder use MTC.

MIDI Clock and Song Position Pointer

Go to the **Song Settings > MIDI Options** page and activate the *Transmit MIDI Clock* checkbox. This means that MIDI Clock and song position pointer will be transmitted whenever LOGIC is running. The particular MIDI output used can be selected on the right-hand side. The setting *P0*, for example, indicates "Printer-Port, transmitting on all outputs".

Both MIDI Clock/SPP and MTC can be sent to the modem and printer ports (port 0 = all outputs): to do this, do not select any particular output (use the "÷" setting).

16

Note for owners of the MIDI Time Piece I

The old MTP I did not support the selection of specific outputs. For this reason, you should always use an "M0" or "P0" setting, as MIDI Clock Events will then always be available from every output, whichever setting you have chosen.

IMPORTANT SPECIAL CASE: Unfortunately, the song position pointer (SPP) does note the port setting. If, for example, you select "M3", SPP will only be transmitted on output 3, while MIDI Clock is available on all outputs. This would mean that a Drum machine on output 4 would start and stop OK, but not be able to dtermine its current bar position from LOGIC at any given time.

Tip   If you sync up a drum machine that does not understand SPP via MIDI Clock, while LOGIC is running in Cycle mode, try switching on the *Allow Song Position Pointer while Playing* option (from **Preferences > Communication**). This should improve timing during the cycle jump.

MIDI Start command

If LOGIC starts at position 1 1 1 1, a MIDI »start« command will be transmitted instead of »continue«. This is important for devices that do not support (SPP).

MiDITime Code

☒ Transmit MTC (MIDI Time Code)   M6

Make the *Tronsmit MTC (Midi Time Code)* checkbox active via the **Song Settings > Midi Options** page. In the space beside the checkbox, you can specify the output of your interface on which MTC will be transmitted (output 6 on the modem port is shown in the example above).

To define the frame rate, open the Tempo List editor (use the pulldown menu on the sync button, or select **Open Tempo List...**).

In the box shown in the diagram, you can choose one of six frame rates from a pull-down menu.

In Europe you should use 25 fps. LOGIC's timing resolution is independent of the frame rate!

MIDI Machine Control (MMC)

MMC are MIDI commands which LOGIC uses to control the transport functions of any MMC-capable tape machine. The recording process can also be controlled and automated from LOGIC via MMC. This tape

machine then provides the SMPTE signal to which LOGIC syncs as a slave (see section *LOGIC as the Slave* on page 16 - 24).

You can control connected devices from LOGIC via the normal "transport" functions (including direct positioning and cycle jumps). Don't forget that LOGIC has to wait for the connected device to finish rewinding or forwarding.

Switching on MMC

Activate *MIDI Machine Control* from the sync button's pull-down menu. You can also temporarily switch the function off from here to allow you to carry out any necessary quick edits.

This option can also be accessed by selecting **File > Song Settings > Midi Options**.

Record Functions

LOGIC supports up to 64 MMC tracks so it can operate devices like the Alesis ADAT™ via MIDI machine control.

Each arrange track can be made to act as a tape track by choosing an instrument with the »tape deck« icon (#305). It is a good idea to group these tracks together in their own folder.

If the tape track is the current record track the following functions apply:

- Selecting the tape track switches the corresponding track on the tape machine to ready and deactivates all the other tracks. To select several tracks for recording use ⌂.

- The record button in the transport panel sends the »record strobe« command to the tape machine. This also puts LOGIC into MIDI record mode, and sends an MMC "Play" command to the tape machine (HDR or whatever). LOGIC doesn't start until it receives the time code back from the multitrack.

- When you use the autodrop function, the tape machine goes into record at the left locator position and drops out of record at the right locator position.

- If you click on any track — not just a tape track — while holding down the ⌘ and ⌂ keys, you can individually toggle the record ready status for each track of the tape machine, ie. selected tracks are switched on and non-selected tracks are switched off. By clicking on a track while holding down the ⌘ key, you can simultane-

16

ously switch all other tracks out of record ready. If the current record track has been assigned a tape deck icon (see above) you must not use ⌷.

- ⌷ (or the key command *Record Toggle*) are used to toggle the record status if a tape track is the currently selected record track.

- After finishing an MMC-operated recording, LOGIC automatically creates an empty sequence on a tape track. This is to let you know that a recording has taken place on the tape and applies to all MMC recordings, including those controlled by the autodrop function. If you activate several tape tracks using ⌷, the corresponding number of sequences are created. If there is already a sequence with an identical start point on a tape track, no new sequence is created on the same track to avoid overlapping objects.

Important You should finish every MMC-controlled recording with STOP or ⌷. Some tape machines react differently to a series of »MMC Record« commands. Sometimes LOGIC shows a track to be recording when the tape is actually playing back (or worse, the reverse situation!). So to be on the safe side, you should always finish a recording with STOP or ⌷!

For owners of the BRC control unit: set the BRC up so that MIDI time code is filtered out during forwarding and rewinding. »Gen Sync« must be switched on to allow MTC to be transferred.

LOGIC as the Slave

If you want to synchronize LOGIC to a second sequencer system or an internally-programmed drum machine you should use MIDI Clock/SPP. In fact you should always use MTC for external synchronization. To synchronize LOGIC to a SMPTE signal you need a synchronizer capable of converting SMPTE into MTC. This function can be performed by most inexpensive multi-port MIDI interfaces.

Choosing the Synchronization Source

If you activate *Auto Sync In* from the sync button's pull-down menu, LOGIC will automatically sync to any external sync source. This setting is the right one in most cases.

⊠ Auto Sync In   • Internal Sync
☐ MIDI Machine Contr   SMPTE Sync (MTC)
☐ Send Used Instr. MI   MIDI Clock Sync

To set the sync source manually, open the **Song Settings > MIDI Op-tions** page. The *Auto Sync In* checkbox has the same effect as its part-ner in the sync button's pull-down menu. To the right of this is the *syn-chronization* pull-down menu. Here, you can choose between:

Internal Sync

LOGIC runs according to its internal clock.

SMPTE Sync (MTC)

LOGIC syncs to external MTC or a SMPTE signal received at the SMPTE input of the interface.

MIDI Clock Sync

LOGIC syncs to MIDI clock / SPP received at any input of the MIDI inter-face.

Switching on external sync

Switching on the sync button on the Transport causes LOGIC to sync to the sync source you've chosen.

Switching off external sync

You can use the Sync button to turn off the external sync at any time, without this changing your choice of sync source. This allows you to re-move LOGIC temporarily from the sync master's time axis. This could prove useful if, for example, you need to quickly edit a sequence while the external sync source (tape machine, VTR etc) is still running.

Receiving MIDI Clock/SPP

Sync via MIDI Clock/SPP is the most accurate method if LOGIC is being synchronized to a bar-referenced master.

> MIOI Clock has a resolution of 24 PPQN (parts per quarter note), while LOGIC has an internal resolution of 960 PPQN (some 40 times more accuratel). For this reason, LOGIC has to interpolate the 39 steps between two incoming clock im-pulses itself.

If you are bothered about small variations in timing between master and slave, you can improve the relationship with external sync by enter-ing the expected tempo changes from the master into LOGIC's internal tempo list as well.

Tip

Even if you don't take this step, the sync should hold up fairly well, as long as you avoid large deviations, such as an internal setting of 200 bpm with an external tempo of 40 bpm.

16

Continue Event

When a MIDI Continue Event is received, LOGIC doesn't leap to the last valid position received via MIDI Clock; instead, playback recommences from the current song position. This allows you to change the song position manually while the sequencer is halted, and restart from the new position with a MIDI Continue command.

MTC Interpretation

Because the MIDI standard only supports four of the possible six time code formats (the 30 fps and 29.97 fps formats cannot be differentiated), LOGIC has to decide which format is 'intended' when it encounters incoming time code:

incoming MTC format	is interpreted as
24 fps	24 fps
25 fps	25 fps
30 drop fps	30 drop fps
30 fps	**29.97 fps**

In other words, the much more commonly used 29.97 fps and 30 drop fps formats are used in preference to the uncommon 30 fps and the virtually-unheard-of 29.97 drop fps formats.

However, you can manually set the format from the Tempo List editor to whatever you like: for example to convert material to 30 fps for black and white TV transmissions in the NTSC format.

Record Function

When »Record« is pressed during external sync, LOGIC goes into MIDI Record mode, but does not start until it encounters external time code.

Example of SMPTE Synchronization

Recording SMPTE

By using the supplied driver software, you can generate a SMPTE signal via the MIDI interface. You then record this on an outside track of your tape machine (for an explanation of the basics, please refer to the section *Synchronization Procedure* on page 16 - 19).

This is how you operate the *MIDI Express Console* driver software for the MIDI Time Piece-compatible *MIDI Express* interface (made by *Mark of the Unicorn*). Start the driver software, and select **Windows > SMPTE Controls**.

- In the top right, set the start time of the SMPTE generator, and below that the frame rate.

- Click *Stripe* to start the generator. Set the level on the tape machine to -10 VU.

- Click *Stop* and then *Stripe* again. The time code now starts again at the set start time. In the top left you can see the current SMPTE time.

- Switch the machine to record and record the time code along the entire length of the tape.

Synchronizing to SMPTE
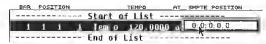
If you want the MIDI Express to convert the SMPTE signal from your tape machine into MTC , go to the same window (*MIDI Express Console* program, **Windows > SMPTE Controls**) and on the left side under *SMPTE to MIDI Conversion* activate the *MIDI Time Code (MTC)* checkbox.

Incoming MIDI Time Code Display

The flashing dot on the transport window's sync button indicates that LOGIC is receiving error-free MIDI time code. If the dot 'sticks', an error has occurred. Although LOGIC is capable of dealing with many MTC errors itself, you should nevertheless check the quality of your SMPTE signal, as well as other potential sources of error (e.g.: is *Auto Sync In* on the sync button's pull-down menu active?).

Setting a SMPTE Offset
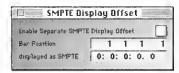
Open the tempo list (the easiest way is to grab the synchronization button and choose **Open Tempo List...**).

16

You can set the position of the first tempo event directly in the *at SMPTE Position* column. This defines the beginning of the song.

SMPTE View Offset

If you want to arrange things so that the time display in all of LOGIC's windows always (for instance) starts at 0:0:0:0 irrespective of the SMPTE offset, switch on the SMPTE View offset. You can do this from the arrow menu on the Transport window, or by selecting **Options > SMPTE View Offset** from the opened Tempo List window.

Clicking on the 'Enable separate SMPTE View Offset' button reveals some lines below the display, where you can enter the time for a particular bar .

The default setting is 0:0:0:0 for bar 1 1 1 1, which results in LOGIC showing the real playback time from the beginning of the song. Of course, you may also set any other time here if required.

The SMPTE View Offset is saved with your song.

Hint   If you want to check that LOGIC is displaying the correct SMPTE time coming in via MTC, you'll have to switch off the SMPTE View Offset! The tempo list always displays the "real" SMPTE time (without view offset).

Post-Synchronization

Post-synchronizing material which is already recorded onto tape inevitably requires a bit of effort. The fewer tempo changes there are in the piece, and the more precisely the tempo was adhered to during the recording, the easier it will be.

- If the tape has not yet been striped with SMPTE, do this first on a free tape track.

- Establish the song's SMPTE offset. LOGIC shows you the received SMPTE time in the transport window (switch off the SMPTE display offset if necessary!). Use this time as a rough guide.

- To fine-tune things, use the reference signal on the tape and notes programmed in LOGIC.

- You can adjust the SMPTE offset in real time. Now try setting an approximate tempo.
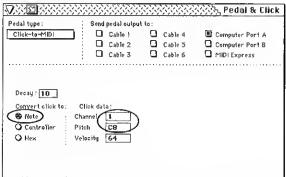
- Once the start time of the song (= SMPTE time of the first tempo event = SMPTE offset) is exactly right, you can set the exact tempo.

- As you get nearer to the end of a section with the same tempo, any deviations due to the wrong tempo setting will become increasingly apparent.

- You can also adjust the tempo setting in real time. LOGIC then recalculates the song position as if the section had run at the new tempo from the beginning.

If you cannot hear any deviations at the end of the song this means that LOGIC is synchronized to the whole song (providing there are no tempo changes).

Automatic Post-Synchronization

If a track of the song contains a percussive instrument with a constant rhythm (e.g. a bass drum) and your interface has an audio-to-MIDI trigger capability (e.g. MTP or MIDI Express), you can carry out some of the post-synchronization automatically.

- Connect the output of the bass drum track with the audio input of the interface.

- In the driver software, set the computer as a destination for the note triggered by the audio signal.

- Use the Tempo Interpreter's *Record Tempo* option.

The screenshot shows the **Windows > Pedal & Clicks** window of the MIDI Express Console software. The MIDI Express uses the pedal input as the audio input if *Click-to-MIDI* is set in the pull-down menu on the top left. Copy the rest of the settings from the diagram. Each incoming percussive signal creates a C8 note (number 120).

16

```
──────────────── Global Commands ────────────────
♩  1   C8    1                              •  Tap Tempo
```

Now assign this note to the Tap Tempo command in the Key Commands window (for more on this, read the section *Assigning a Function to a MIDI Message* on page 4 - 25). For more on using the Tempo Interpreter, check out the section *Tempo Interpreter (Manual Sync)* on page 16 - 8.

Functions

Converting the Bar Ruler / Position Display to SMPTE Time

Use **View > Show SMPTE Time Ruler** to individually switch the bar ruler in each window to a time ruler. The number on the left of the vertical lines refers to minutes and on the right refers to seconds. If the vertical height is sufficient, the time ruler is shown as well as the bar ruler.

In the Event List editor, selecting **View > Position & Length in SMPTE Units** switches all the positions and lengths to SMPTE times.

Both functions have the same key command: *Positions/Time Ruler in SMPTE units.*

If the time ruler is switched on when you move position:

*   the position in the info line is also shown as a SMPTE position (e.g. in the *Giant SMPTE Display* transport buttons),

*   holding down the ⌃ key switches the measurement to frames and holding down the ⇧ key as well switches it to subframes.

Naturally, the time ruler takes account of any tempo changes.

Logic

Positioning Bars at specific Frames

If you want to reach a specific position in a song at a certain SMPTE time you have to adjust the tempo in the preceding passage. However, you needn't rely on trial and error to set the appropriate tempo changes yourself.

- Open the tempo list (page 16 - 3).

- Create a tempo event at the required bar position (page 16 - 3).

- Set the desired time position for this tempo event in the *SMPTE Position* column. The previous tempo event will be adjusted to produce the desired bar and time position for the "auxiliary tempo event".

- You can delete the "auxiliary tempo event" if you want to keep the resulting tempo for the following passage.

Positioning Objects at specific Frames (Pickup Clock)

Set the song position to the required SMPTE time, e.g. by going to a specific frame of the film. Select the object which you want to begin at this time (it doesn't matter whether this is an individual event , tempo event or an arrange object). *Pickup Clock* then sets the start time of the object as required, *Pickup Clock and Select Next Event* also selects the next object, so that after making alterations you can carry right on.

Fixing Objects to Frames

With film synchronization you often want specific sound effects (e.g. noises) to come at the right SMPTE time to go with a certain film frame, rather than a certain bar position.

If the tempo of the piece needs to be altered later (for dramatic reasons, say), then the SMPTE time location of events that have already been positioned will change. The *Lock SMPTE* function prevents this happening.

You can SMPTE-lock single events in the Event List or entire Arrange objects (with all the events they may contain).

Functions > SMPTE Position > Lock

Selected objects are "chained" to their current SMPTE position. If there are any tempo changes, the bar position of the "locked" objects are adjusted accordingly, and a small padlock symbol appears in front of their names.

16

Copies made of sequences or folders locked in the above way do not preserve the locked setting, whether copied/pasted via the clipboard or by dragging while the ⌥ key is held down.

Functions > SMPTE Position > Unlock

All selected objects which were "chained" to their SMPTE position are now fixed to their current bar position, just like normal events. This means they may once again be shifted by any future tempo changes. The padlock symbol in front of the name disappears.

You can fix individual events in the event list or whole arrange objects (and any events they contain).

Synchronizing QuickTime™ Movies

QuickTime™ is a Macintosh standard for digitized, data-compressed films which can run in windows. If you want to play these films you need the System extension shown below in your System folder.

QuickTime™

You also need a fast hard disk and above all a fast Mac so the display is not too jerky. If you want to record a film like this yourself from a video recorder you need specialized hardware (an AV Mac at least) and the relevant software.

You can make QuickTime movies run in a LOGIC window in sync with a song. Wherever you move the song position the film follows.

Opening a Movie

Choose **Options > Movie...** in the Arrange window to open the familiar file selection box. You can then choose a QuickTime movie from your hard disk.

If you select **Options > Movie as float**, you can open a QuickTime movie in a float window (as you might expect from the name!).

Reopening a Movie

The key command *Open Movie Again* reopens a movie window with the same film. This is particularly useful if you wish to open the film in a different screenset.

Logic

Working with Movies

In the QuickTime window you can enter the SMPTE offset of the film at the bottom (the *Movie Start*); this is independent of the SMPTE offset in the song. By grabbing and dragging the position slider at the bottom of the picture or by using the forward/rewind buttons to the right you can move the film to any position and LOGIC will jump to the corresponding song position. All the QuickTime transport functions interact with those of LOGIC.

Optimal Image Size

If you click once on the video image, the QuickTime window will expand to fill the whole screen in such a way that the entire video image, whatever its shape, just fits your monitor. The window borders will also disappear (*Best Size without Borders*).

This proportional enlargement does mean that strangely-shaped images may not fill the monitors. However, there are two advantages: the proportions of the image are retained, and, because the graphics card is not overloaded with conversion calculations for disproportionate images, a faster screen refresh rate can be obtained.

Clicking on the image restores it to its original format.

If you have an accelarated graphics card, it is usually attached to the monitor that does not contain the main menu. You can check or change the setting from the *Monitor* control panel.   Hint
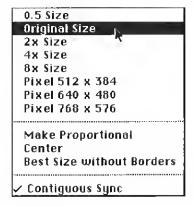
Since MacOS System 7.5 all images on connected monitorshave had individually rounded edges. This can affect the performance of an accelarated graphics card: if yours appears to work more slowly under System 7.5 than under older MacOS versions, please contact the manufacturer of your graphics card.   Hint

16

Options

Clicking and holding on the movie image opens the following menu:

```
  0.5 Size
  Original Size      ▶
  2x Size
  4x Size
  8x Size
  Pixel 512 x 384
  Pixel 640 x 480
  Pixel 768 x 576
..................................................
  Make Proportional
  Center
  Best Size without Borders
..................................................
✓ Contiguous Sync
```

From here you can set various proportional image formats, from half-size to 8x size.

The following image sizes are also selectable, to allow a non-proportional enlargement of the image if it is oddly-shaped for the monitor you are using:

512 x 384 pixels

Changes image size to NTSC Underscan format.

640 x 480 pixels

Changes image size to PAL Underscan, or NTSC Overscan format.

768 x 576 pixels

Changes image size to PAL Overscan format.

Make Proportionol selects the next-largest proportional setting.

Center places the video image in the middle of your screen.

Best Size without Borders is equivalent the the rapid click on the video screen, as described above.

Synchronization Method

The *Contiguous Sync* option allows you to switch between the following sync methods:

When **Contiguous Sync** is turned on, LOGIC controls the playback speed of the movie, so as to keep music and pictures in sync at all

times. If the film has a soundtrack, the audio signal will be transposed slightly if necessary, by means of sample rate conversion.

This sync method is possibly more precise, but requires greater processing power.

Movie Drop Sync (with Contiguous Sync switched off) means: the QuickTime movie will be shown at its original speed. If any time corrections need to be made, this is done by repeating frames or omitting them. If their is a soundtrack, a quiet click will be heard at this point. This method is also usually reasonably accurate.

Try out the different methods to see which one gives the best results for your computer. Please note that when you switch sync methods, LOGIC needs up to a few seconds before it can establish the new sync method.

In Internal Sync mode, the Global Timer Adjustment parameter (**File > Preferences > Compatibility**) allows you to alter the replay speed of QuickTime movies. By using extreme settings, you can investigate the relationship between the film, your graphics card and the different sync methods. But don't forget to return these parameters to normal after experimenting with them!

Tip

16
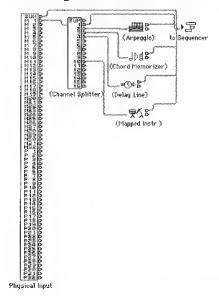
Chapter 17
Spotlights

This chapter contains useful tips, comments and support for a few specialized situations. It is assumed that you have knowledge of the basic functions and some practical experience with LOGIC.

17.1   Tips and Comments

Using MIDI Effects Universally

If you want to use MIDI effects like the delay line, arpeggiator or chord memorizer as universally as possible on any instruments it is helpful to use an Environment configuration such as the one shown below:

The master keyboard is connected to port 1. By changing the transmit channel you can call up different effects on any instrument on the se-

lected track. The effects produced will also be recorded at the same time.

Any master keyboards or fader boxes connected to other ports are un-affected.

In the example shown MIDI channel 1 is being used for normal record-ing with no effects, channel 2 is assigned to an arpeggiator, channel 3 goes to the chord memorizer and channel 4 creates delay effects.
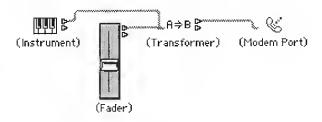
If you transmit on channel 10, the notes can be diverted via the mapped instrument from your favorite key assignment for drum sounds to the key assignment (eg. the GM standard) of your synth or sound source. This allows different recorded notes for a drum instru-ment to be stored at a convenient pitch, so the drum notes will be easy to edit, even in the Matrix Editor.

Of course you could connect more effect objects to the other outputs of the channel splitter!

Modulation Wheel for Velocity
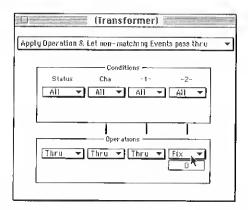
The numerical values of the "operation" boxes on a transformer object can be altered in real time using meta events 126 and 127 (for more on this, see the section *Remote Controlling the Condition and Operation Values* on page 7 - 34). For example, you could adjust the velocity val-ues of notes using the modulation wheel.

• Create the following configuration in the Environment:

(Instrument)   (Transformer)   (Modem Port)

(Fader)

• In the transformer, set the operation *Byte 2 = Fix.*

• In the fader parameter box, set the In definition to *Status = Control* and *Byte 1 = 1* and the Out definition to *Status = Switch/Meta* and *Byte 1 = 127.*

If you now set the fader as the current track instrument by clicking on it with the MIDI Thru tool, you can use the modulation wheel to control

the velocity of all notes output by the instrument assigned in the top left.

17.2   Specialized Situations

Recording Several Musicians

The Problem:

You want to record the MIDI events from several musicians simultaneously on different tracks, but LOGIC only allows one record track.

The Solution:

- Set different transmit channels for the individual musicians. (If this is not possible, use different MIDI inputs and then have a transformer object transform their signals onto different MIDI channels before they reach the sequencer input.)

- Create a new instrument. Set its *Cha* parameter to *All* ("all channel instrument").

- Create a channel splitter.

- Connect a cable from the all channel instrument to the channel splitter.

- Connect cables from the transmit channels of the outputs of the channel splitter to the instruments.

17

- Set the all channel instrument in the track list as the instrument for the record track. The different instruments can now be played by several musicians.

- Make the recording.

- Choose the function **Structure > Split/Demix > Demix by Event Channel** for the recorded sequence.

You have now separated the recordings of the individual musicians on-to different sequences on different tracks, so that you can edit them separately.

Polyrhythms

The Problem:

You want to simultaneously play parts of the song which have different tempos or at least merge them over long stretches, but LOGIC only allows one global tempo at a time.

The Solution:

- First play one of the parts at a suitable tempo.

- Select all the relevant arrange objects and choose **Functions > SMPTE Position > Lock**.

- You can now alter the tempo without affecting the position of the fixed objects. Any alteration in the time signature will not affect the playback.

- Now record the other part.

- At any time you can select all objects and use the same function to fix them to SMPTE time and then restore the original tempo. Make a note of the different tempos.

Count-in for a Tempo Change

The Problem:

LOGIC is synchronized to a tape machine via time code. The song has a slower instrumental intro and then the drums begin at a faster tempo. At the end of the intro the drummer needs a count-in at the faster tempo.

Logîc

Comments:

This problem is a difficult one because with external synchronization you can't alter the tempo without either losing the relationship to the tape tracks or recalculating the SMPTE offset. Even the simplest solution is relatively complex.

The Solution:

- First record the count-in, e.g. as a 4/4 cowbell sequence on the first bar of the drums at the faster tempo. Make sure you record the first beat of the following bar as well; this point is important. Set a suitable quantization.

- Lengthen the count-in sequence at the front, or create an empty sequence at least two bars in front of it, and join the two sequences.

- Open an Event List by double-clicking on the count-in sequence. Here switch to **View > Position/Length in SMPTE units**.

- Double-click on the position of the first note and copy its position into the clipboard by pressing ⌘C.

- Open the tempo list. Temporarily set the first tempo event (intro) to the following value. Make a note of the original intro tempo!

- Now select all notes in the Event List of the count-in sequence (⌘A).

- Double-click on the position of the last count-in note (the one on the first beat of the following bar) and paste in the position from the clipboard by pressing ⌘V.

- Now choose **Functions > Lock SMPTE Position**.

- Set the original tempo of the intro in the tempo list.

During the intro with the slower tempo you will now hear the correct count-in for the following passage at the faster tempo, without having to make any complex calculations.

Environment Layer for Mixer Mute Automation

The Problem:

The Mute automation on some mixers works solely with Note On/Off events, which control the channel mutes. If you try to create an Environment layer in which the mute status of individual channels is shown by buttons, you'll run into a problem: buttons with the In definition

17
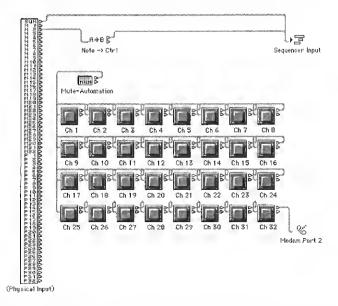
»NOTE« can show Note On events, but not Note Off events. This is be-cause of the way MIDI notes are recorded: Note On and Note Off events are only generated when the song is played back.

Comments:
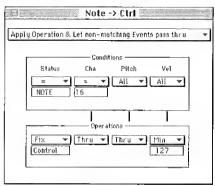
If your mixer's mute automation can be run by controller information, you can use this feature. But even if your mutes can only be controlled via note events, there is a way to signal their status in the Environment, which you can then use to remote-control the mutes.

The Solution:

Use a Transformer to convert the note events controlling the automa-tion into controller information before they reach the sequencer. Record the events onto a track with a "mute automation" instrument. From the output of this instrument, the events pass through buttons for each individual channel before they reach the physical output where your automation is connected. You should be able to work out the exact details of the signal path from this diagram.

In this example, the MIDI output from the mute automation is con-nected to Input 2 on the modem port interface. This signal alone is run-ning through the transformer marked »Note -> Ctrl«, which should be set up as shown in the diagram.

The »Condition« *Cha = 16* setting ensures that only notes on channel 16 are converted to controllers. Set your automation to this MIDI channel.

The controller numbers created match the original note number. Usually the mixer channel numbers arer used (eg. channel 12 -> note # 12 -> controller # 12). If the mute automation is working with a particular note number offset (for example note number 36 — C1 — for channel 1), you should use the *Operatians* box to subtract the number of the offset minus one from the -1- data byte (*Pitch*) — in this case *Sub 35*. This allows you to read the channel number from the controller number, without having to work it out in your head.

The »Operation« setting *Min 127* can be omitted; it just ensures that the controller values switch between 0 and 127, and not, say, 0 and 64. This makes mute events more easily visible in the graphic editors, if the note events created by your mute automation have velocities less than 127.

To record mute events, you use the instrument shown here entitled »Mute Automation«. The *No Reset* option should be switched on in the parameter box for this instrument.

From there, the signal passes serially through the button-shaped fader objects. The button definition for, say, channel 1 should appear as shown right.

If you are making an Environment layer like this, please take a look at the hints in the section *Useful functions for Object Groups* on page 7 - 42. In particular, **Apply Buffer Template to Definition, number increment** and **Cable serially** should prove useful.

The buttons aren't just for displaying the current mute status of all the individual channels; you can also create and record mute events with them.

17

Scene-orientated Film Music

The Problem:

Film music often contains segments at different tempos, which all have to commence at certain fixed times in the film (ie. at certain SMPTE addresses). However, each segment has to have its own tempo and some references to bars and beats — this is how LOGIC's position grid and quantize functions work, after all.

Example:

Imagine you're working on some music for a TV series. The time code start point is 00.00.00.00, and the director's requirements are for a 20-second, slow intro, then 12 seconds without music, and then a fast theme to accompany a chase.

Basic Rule:

Use tempo changes to ensure that the bar grid in the sequencer agrees with the real one.

Solution to the Example:

• First, play the slow intro in any tempo you like. A tempo event will appear at Bar 1 that will apply to the whole song at first.

• Then comes the clever bit; add a second tempo change at the end of the long intro. (if the tempo is 120 bpm, the tempo change would come at bar 11) The new tempo is unimportant: it will be replaced in a minute anyway.

• Then comes the pause: in this example 12 seconds, a reasonably long time. Here is where you enter the third tempo change. All you need to do is type in the SMPTE time you want this to happen at (in the example 32 seconds). The bar number can be almost anything you like, as long as there is a reasonable distance between the second and third change (there's more than enough in this example, as LOGIC can cope with very small distances between tempo changes). LOGIC now automatically changes the tempo in the second tempo change to make the third happen at the right SMPTE time. Place the third tempo change on a bar line (say bar 15), so you can use the metronome and quantize functions later.

That's it! The second tempo change is what makes it all work: it "protects" the tempo of the first section, and ensures that the third tempo change can fall on a round bar line number.

Chapter 18
Glossary

– 1 –
Abbreviation for first data byte, used in parameter boxes.

32-bit addressing
When running LOGIC this must be switched on in the "Memory" control panel.

Aftertouch
MIDI data type generated by pressing harder on keys while they are being played. Only one editable value per keyboard.

Alias
Double of an *object* which does not contain any data itself but just refers to the data of the original.

Autodrop
Automatic *drop-in recording* with adjustable drop-in/out positions.

Bar ruler
Ruler at the top edge of the screen divided into bar units.

BBS
Bulletin Board System: an electronic mailbox.

Cable
A virtual cable represents the MIDI connection between two Environment objects.

Catch
Function for making the section of the song currently displayed in the window reflect the current song position.

Cha
Abbreviation for channel or MIDI channel

Check box
A small box. Placing a check in it (by clicking on it) activates an option.

Click
Metronome or metronome sound.

Clock

Electrical impulse every 1/96 note, used in days gone by to synchronize different devices (see MIDI clock).

Controller, control change

MIDI data type, eg. for pitchbend wheels, sliders, pedals, switches or standard parameters like volume and panning.

Count-in

Beats that sound prior to the start of a recording.

C-Press

Channel pressure or *aftertouch*.

Cueing

Monitoring while fast-forwarding or rewinding.

Cycle

Function which constantly repeats the passage between the *locator positions*.

Data bytes

These define the content of a MIDI message. The first data byte represents the note or controller number, and the second the velocity or controller value.

Default, default value

The preset parameter value.

Delay

In the Environment window, an object that can create a series of repeats. In the Arrange window, a *playback parameter* which can delay or advance a selected Track by a given number of milliseconds.

Dialog, Dialog box

A window containing a query or message. It must be cancelled or replied to before it will disappear and leave you to get on!

Display Format

Adjustable note value for the display grid used in operations. Third figure in the position indicator.

Drag & Drop

Grabbing objects with the mouse, moving them, and releasing them.

Drop, drop-in, drop-out

Going into and out of record to "record over" one section of an existing "recording".

Edit

Local menu with clipboard functions.

Editor

Window for editing MIDI Events.

Erase

Delete

Event definition

Parameter for defining the display of a line in the *Hyper Editor*.

Flip menu

See *Pull-down menu*.

Float window

Window with special status which always "floats" on the surface above all the other windows, but can only be operated with the mouse.

Folder

A "song within a song". This can contain either a complete arrangement or just parts of it: sequences or other folders.

Font

Character printing style.

Frame

Unit of time. A second in the *SMPTE* standard is divided into frames, corresponding to the frames in a film.

General MIDI (GM)

Standard for MIDI synthesizers which basically prescribes sound names for 128 program numbers and a keyboard allocation for drum sounds (on MIDI channel 10).

Grab (an object)

Placing the mouse pointer on the object, pressing the mouse button and keeping it held down.

GS
Extended *GM* standard developed by the company Roland.

Hide
Remove from the display.

Hierarchical menus
Structured menus where highlighting an individual entry opens yet another menu.

Hyper set
All simultaneously displayed event definitions in the Hyper Editor.

Icon
Small picture symbol.

Info-line
Appears on the upper edge of windows during mouse activity with tools.

Insert
Add.

Instrument
The virtual counterpart in LOGIC of a real sound source or synth module.

Key command
Function which can be executed by pressing a specific key.

Legato
Smooth and connected manner of playing. Notes last until the next note.

Local menu
Menu in a window containing functions which are relevant to only that particular window.

Locators (left and right)
Two storable song positions.

Loop
Constant repetition of an object up to the next object in the same track or the end of the higher folder or song.

Merge
Mix, combine together.

Meta event

Type of event in the Event List. Contains non-MIDI events like text or screenset configurations.

MIDI, strictly "MIDI"

Standard for interface hardware and transfer protocol known as Musical Instrument Digital Interface.

MIDI Clock

Short *MIDI message* for *clock* signals. See also: SPP.

MIDI event, event

A stored *MIDI message*.

MIDI message, message

A message transferred via *MIDI*, consisting of 1 status byte and 0, 1, 2 or more data bytes.

Modifier (Special keys)

Computer keyboard keys used together with "normal" keys to change their function: ⇧ ctrl ⌥ ⌘.

Modulation

Generally, a change. The MIDI meaning is controller no. 1, transmitted on keyboards by the non-centred control wheel (or by moving the joystick vertically).

Moving

Grabbing an object, moving it with the mouse button held down and releasing it at the target position.

MTC, MIDI Time Code

"Translation" of a *SMPTE* signal into the MIDI Standard.

Mute

Switch off (a sound or track).

Normalize

This function applies the settings of the current *playback parameters* to the selected events (by altering the actual events themselves), and clears the *playback parameter* settings.

Note number (Note #)

Pitch of a MIDI note, transferred in the first data byte of a MIDI note event.

Object

In the Arrange window, a general term for *sequences* or *folders*. In the Environment, also applies to instruments, faders, *etc...*

Option

Alternative function, often in the form of a *checkbox,* sometimes also as a menu entry to be ticked. Can be activated or deactivated.

Parameter box

Field on the left side of the screen where you can adjust the parameters of the selected object.

Paste

Add, insert.

Pitch Bend Message

MIDI message transmitted by a keyboard's pitch bend wheel.

Pitch Bend Wheel

Hand wheel for generating pitch bend messages.

Pixel

One matrix dot on the computer screen. Short for "picture element."

Playback parameters

These do not actually alter the stored data; they modify events during playback only.

Position indicator

Units: bars, beats, sub-divisions (often written simply as *divisions* in this manual) and ticks.

P-Press

Polyphonic key pressure. *Aftertouch* measured by each individual key. Only a few keyboards implement this.

Preferences

Storable settings for a program.

Pull-down menu

Selection menu which opens when you *grab* the parameter input box. Occasionally known in this manual as a flip menu.

Punch In / Punch Out

Going into and out of record.

Quantization

Time-correction of note positions by moving them onto the nearest point on a selectable grid.

Replace

Function where a new recording replaces the old one.

Rubber band

Frame which can be extended with the mouse and selects all the objects it covers.

Scroll bars and scroll box

Gray beam at the edge of a window with a movable box inside it for adjusting the section of a song displayed by the window.

Screen set

Storable layout of the various LOGIC windows.

Scrubbing,

On tape machines: manually moving the tape across the tape head. In a sequencer: manually moving the song position through the song during playback of the MIDI events.

Selecting

Choosing. Selected objects are displayed in inverted colours.

Sequence

A collection of MIDI events which is shown in the Arrange area as a horizontal beam with a name on it.

SMPTE

Standard for time coding in a specialized sound signal used for synchronizing different devices. There are six formats. Named after the Society of Motion Picture and Television Engineers.

SMPTE time or address

Specific "counter position" of a "SMPTE clock". Composed of hours, minutes, seconds and *frames*.

Song Position Line

Vertical line in the Arrange, Matrix and Score windows which indicates the current song position. It can be grabbed with the mouse and moved (see *scrubbing*).

SPP, song position pointer

A specific type of MIDI message which gives the distance from the song start in 1/16 notes and is transmitted along with MIDI clock.

Sound generator
See *Sound source.*

Sound source
General term for MIDI-controllable synthesizer, sampler, drum ma-chine, digital piano, etc.

Standard MIDI File
Standard format for exchanging songs between different sequencers.

Status byte
First byte in a MIDI message, which determines the type of message.

Subframe
A sub-division of a SMPTE *frame*, corresponding to the individual bits of a SMPTE frame. One frame consists of 80 bits.

Swing
Parameter which alters the rigid timing of a quantization grid by delay-ing every other note of a specified *sub-division* by a definable amount.

Synchronization
Method of ensuring the parallel running of several recording/playback devices.

Synchronizer
Unit for centrally controlling the synchronization of several devices.

Tick, plural = ticks
The smallest division in the resolution grid of a sequencer. In LOGIC this is 1/3840 note.

Timing
Measure of the ability to play notes at the right time.

Toggle
Switch backwards and forwards between two states (windows, param-eter values, etc.)

Track column
Situated to the left of the working area of the Arrange window.

Track object
Environment object defined in the track column of the Arrange win-dow to which the data of this track are routed.

Undo
Function which reverses the previous operation.

Velocity

Force with which a MIDI note is struck; transferred in the second data byte of a note event.

View

Local menu with display options.

Virtual memory

Area of the hard disk which can be used by the Mac as an extension of the RAM memory. The disadvantage in using it is its very slow access time. When running LOGIC it must be switched off; this is done from the "Memory" control panel.

Window class

Window status; either *float* or normal.

Window type

Description of the display/function of a window, e.g. Arrange or Matrix Editor.

Work area

The area of a window in which you edit objects (folders, sequences, events, environment objects). Usually on the bottom right of the window.

WYSIWYG

"What You See Is What You Get". The ability of a program to accurately display the forthcoming printout on the screen, eg. Page View mode in LOGIC's Score window.

WYGIWYNSB

"What You Get Is What You Never Seen Before". *Inability* of a program to display the forthcoming printout on the screen, despite assurances to the contrary.

Zoom function

Shrinking or enlarging the display in LOGIC windows.

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Chapter 1
Setting Up Your System To Work With LOGIC Audio

Chapter 2
Introduction

Chapter 3
Using Audio Objects in the Environment

Chapter 4
Using Audio in the Arrange Window

Chapter 5
The Audio Window

Chapter 6
The Sample Edit Window

Chapter 7
The Digital Factory™

Chapter 8
Global Functions and Preferences

Chapter 9
Appendices

Lo**g**ic

Chapter 10
More About DAE

Chapter 11
More About AV

Chapter 1
Setting Up Your System To Work With LOGIC Audio

The principle behind LOGIC Audio is simple; it lets you record any Audio signals you like onto hard disks. You manage all the recordings you make in this way with a user interface that may already be familiar to you from our LOGIC (straight LOGIC, hold the Audio) software. LOGIC Audio is a 'stand-alone' program that offers you exactly the same functions for controlling MIDI events that LOGIC does. You can even swap Songs from one program to another — of course you can only play back the Audio recordings you've made from within LOGIC Audio!

To run LOGIC Audio, you'll need specialized hardware which is not supplied with all computers. For details please refer to section *AV Operation*, on page 1 - 2 section *Additional Hardware*, on page 1 - 3.The program will run without this hardware, but you won't be able to record or play any audio signals.

1.1   Your Computer

The minimum requirement for running LOGIC Audio in computer terms is an Apple Macintosh IIx. Nevertheless, we strongly advise you to use a Macintosh with at least a 68030 processor and 25 MHz clock rate (such as the "vx"). Ideally you should use a Macintosh with a 68040 processor, i.e. the Macintosh fx, or any model from the Centris/Quadra series.

If you want to run LOGIC Audio on a Power Macintosh for reasons of speed and operating safety we strongly recommend the LOGIC Audio PPC version. For complex processing (like the Digital Factory functions) the Power Macintosh's performance is far superior to the Quadra models.

AV Operation

LOGIC Audio runs without the need for additional hardware on all so-called 'AV' Macintoshes (Quadra 840AV or 660AV), all 500-Series or 5000-Series Powerbooks, and all Power Macs (6100 to 9500). Please note that any model with the description "Power Macintosh" in the name, does <u>not</u> need an Apple AV card. These Macs are already fitted with the necessary 16-bit converters.

Throughout the rest of this manual, the process of running LOGIC Audio with the aid of the built-in (stereo) 16 bit converters in these computer models will be referred to as **AV Operation**.

Important   For AV operation please see – in addition to the following information – the notes in Chapter 11 *More About AV*. In this operating mode you need extra hardware for your system!

Operating System

LOGIC Audio requires the Apple Macintosh operating system (Mac OS) Version 7.0 or higher. We recommend System 7.1 or System 7.5. At the time of printing there was a positive response to System 7.5.3. This seemed to be ideally suited to operating Power Macs with a PCI bus.

Memory

If you're going to run LOGIC Audio without any problems, you'll need at least 8 Megabytes of RAM, but once again, we recommend more; 16 Meg at least (68k models up to System 7.1.2: 12MB), particularly if you're hoping to run more than 4 tracks of digital audio. Again, the moral is simple: the more RAM, the better.

Your Hard Disk

To run LOGIC Audio you need a SCSI hard drive with an average access time of 18 milliseconds or less, and a data transfer rate of at least 800 Kilobytes per second. If you want to use more than four tracks of digital audio, we advise you to use a hard drive with even better specifications. It should have a mean access time of less than 10 milliseconds, and a data transfer rate considerably greater than 1 Megabyte per second.

If you want to make optimum use of the audio features we advise you to reserve one hard drive just for audio recording.

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If you're not sure just how fast your chosen hard drive is, don't despair; you can find out with ease by using a benchmark program (such as FBW's »Hard Disk Toolkit« or Maxa's »Snooper«). If you're stuck, ask your dealer for more details.

We recommend that you make a generous estimate of the size of the hard disk that you're recording onto and avoid using the last MB of memory.

CD-ROM

LOGIC Audio is supplied on a floppy disk. Any future updates will be supplied on floppy disk, via a mailbox or the Internet. However, if you want to get the most from all the support files such as Tutorial or Setup Songs you need a CD-ROM drive.

The speed of this drive does not matter. However, if you want to play QuickTime movies directly off CD we recommend at least a double-speed drive.

1.2   Additional Hardware

In order to run LOGIC Audio you need additional hardware with analog/ digital and digital/analog converters (A/D and D/A) and if necessary also digital signal processors (DSPs). This hardware can either come in the form of a card for the Macintosh's internal Nu-Bus or PCI-Bus, or as a free-standing hardware unit. In this manual it will be referred to as HDR hardware (Hard Disk Recording hardware).

At the moment, LOGIC Audio supports the following hardware:

- **AV** – the internal converters in the Power Macs (or 68k AV models)

- **DAE** – Digidesign's AudioMedia II and III, Sound Tools, or Session 8 or ProTools II

- **TDM** – Digidesign's ProTools III (and ProTools IV, as soon as available)

- **CBX** – Yamaha's CBX-D5 or CBX-D3

You can of course swap any LOGIC Audio Songs, including any recorded Audio material, between any of the various Hardware setups supported by LOGIC Audio. So, for example, you could take home recordings

made in your project studio with your Yamaha CBX-D3 and edit them in AV-mode there, and then do the final mixdown of the edited song on a Pro Tools III system in a mixing studio. When you swap between different computer platforms (Mac/PC) you have to convert the format of the audio files using LOGIC Audio's integrated functions.

Remember that all LOGIC Audio's destructive audio editing functions (Digital Factory) will work on any hardware! The main difference in HDR hardware – apart from different numbers of tracks – is the range of possible realtime effects (e.g. playback equalizer).

Extensions

We constantly update LOGIC Audio so it can interface with any new external hardware that becomes available. We chose to make these updates available in the form of software 'extensions' to the main body of the program, as this approach has various advantages:

- It means LOGIC Audio isn't weighed down with functions which you don't need for your particular hardware setup,

- You don't end up paying for functions you don't use,

- You can expand your hardware setup at any time according to your functionality requirements,

- and you can operate various audio extensions together in any combination you wish.

Note   When you purchase the basic LOGIC Audio package, you can choose whether you wish to use the internal sound card hardware in the Windows Multi Media Standard of the PowerMacintosh or 68k AV models (**"AV"**) **OR** Digidesign hardware products (**"DAE"**) when you install the program. If you are going one of these two hardware routes, no further extensions are necessary!

You only need another extension if:

- you're using another kind of hardware (for example Yamaha's CBX), or

- you're using two kinds of hardware extensions simultaneously (for example "AV" and "DAE" together).

The following couple of paragraphs give a brief description of the software extensions currently available. Please also note the information accompanying each extension.

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The AV Extension

The AV-Extension allows LOGIC Audio to make use of all Apple computers with 16-bit A/D and D/A-converters.

LOGIC Audio supports the AV hardware without the additional need for the AV extension. You only need it if you want to use the AV features **in addition to** DAE hardware. In any case, please read Chapter 11, 'More About AV'; it has a lot of help to offer if you're running LOGIC Audio with AV hardware.

The TDM Extension

The TDM extension allows LOGIC Audio to make use of the TDM functions driven by Digidesign's ProTools III (IV) hardware.

The TDM bus gives you access to a series of functions far beyond those offered by the other LOGIC Audio-compatible systems.

Although it is possible to use ProTools III (IV) hardware without the TDM extension, you have to do without the TDM functions. In this case the range of functions would be similar to Session8 hardware.

The CBX-Extension

The CBX extension allows LOGIC Audio to make use of Yamaha's CBX-D5 and CBX-D3. These devices are separate hardware units which make it possible to run LOGIC Audio's hard disk recording functions in professional quality even on Macs without NuBus or PCI slots.

Running LOGIC Audio with CBX hardware is a little more complicated than running it with DAE hardware. As a result, **the CBX Extension must be used when using CBX hardware in conjunction with LOGIC Audio.**

Number of tracks / Ins & Outs

The following table shows various types of audio hardware with their respective number of physical tracks (i.e. how many signals can be recorded/played at once) and number of physical Ins and Outs.

Hardware	No. of Record/ Playback Tracks	No.of Ins/ Outs	Digital Ins/Outs
AV operation[1]	2 / 4-16, depending on model	2 / 2 unbal.	none
Sound Tools: Sound Accelerator & AD In	2 / 4	2 / 2	none, only with DAT I/O interface
ProTools with 442 I/O	4 / 4 per unit, up to 16 / 16	4 / 4 per unit	4 / 4, S/P-DIF, AES/EBU
AudioMedia II	2 / 4	2 / 2 unbal.	2 / 2, S/P-DIF
Audio Media III	4 / 8	2 / 2 unbal.	2 / 2, S/P-DIF independently available.
Session 8	8 / 8	8 / 8	2 / 2, S/P-DIF
ProTools III with 882 I/O	8 / 16 per unit, up to 48 / 48	8 / 8 per unit up to 64 / 64	2 / 2, S/P-DIF
ProTools III with 888 I/O			8 / 8, AES/EBU
CBX-D3	2 / 4 per unit, up to 4 / 8	2 / 4 per unit	2 / 2, S/P-DIF
CBX-D5			2 / 2, AES/EBU

[1] For more specific information, see Chapter 11, 'More About AV'.

Note: a digital audio interface in the AES/EBU or S/P-DIF norm always has two channels. The description "2/2" therefore means: one In and one Out. Normally

the digital and analog interfaces are in "parallel", and therefore carry the same
signal. The exception is AudioMedia III.
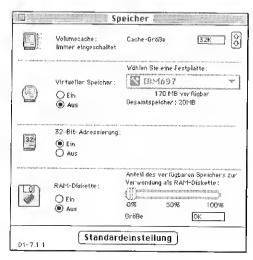
1.3 Adapting your System

An integrated Midi/hard disk recording setup makes great demands on
your computer system. To allow all the components to work efficiently
you need to make certain adjustments to the operating system.

"Memory" Control Panel

To ensure that LOGIC Audio runs correctly you have to make the follow-
ing settings in the *Memory* control panel:

* always switch **on** »32-Bit Addressing«,

* switch **off** »Virtual Memory«, and

* set the smallest possible value for the Cache Size (32K), particular-
  ly if you are using LOGIC Audio in AV mode!

Control Panels and System Extensions

Sadly, you can never quite discount the possibility of strange side ef-
fects resulting from interaction between certain Control Panels and

System Extensions (or »Inits«). So to start with, only boot up LOGIC Audio with the System Extensions you really need; for example the DigiSystem INIT if you are using Digidesign hardware.

Unnecessary System Extensions and Control Panels can have a negative effect on your computer's performance, particularly if you are using AV hardware.

Important **Avoid** any programs that run all the time 'in the background', particularly those preoccupied with keeping time, like screen savers.

If you discover that a particular System Extension is disrupting LOGIC Audio, we'd be grateful if you could write and tell us. We can then let other users know, and try to find a cure.

Extensions Manager

With the help of utilities like Apple's Extensions Manager or NowUtilities' Startup Manager, you can turn your Extensions on and off as you like. Do ensure, however, that you have the DigiSystem INIT installed and turned on if you are using Digidesign hardware!

Speed Access

Important If you have installed the *Speed Access* System extension (from Connectix) you will not be able to authorize any LOGIC Audio extension. You will have to remove it before installing the LOGIC extension. Once you have installed and authorized the LOGIC extension you will be able to reinstall Speed Access and continue using it.

Speed Access increases the disk cache buffer of the operating system to 1024k, without telling the user. This is detrimental to any HD recording system. After you install it you should therefore reset the *Volume Cache* in the *Memory* control panel to its original value, e.g. 32k.

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HP Background

Unfortunately, you also have to do without background printing. Switch off (or remove) this control panel!

1.4   Installation

Installing your hardware

If you were about to install your LOGIC Audio software — hold it right there. Before you do that, you need to install the necessary additional hardware. (This doesn't apply if you're running an AV Mac that doesn't need it).

Please read the hints on installing your hardware supplied by its manufacturer, as well as the relevant section in this manual on installing the appropriate extension to drive your hardware.

The Copy Protection Key

To get LOGIC Audio running, you need a special LOGIC Audio key.

Connect up the key as shown in the 'Installation' chapter, (the section on 'The Key') in the first part of this manual.

Installing your software

Insert LOGIC AUDIO 2.5 Disk #1 and double-click on the Installer. Please read the notes in the window that appears.

Choose **Easy Install** to install all the necessary files.

Alternatively, you can click on **Custom Install** and pick the files you wish to have installed manually; to do this, follow the instructions in the Installer program.

Now please follow the instructions of the Installation program.

The most recent versions of the DAE and DigiSystem INIT will now be automatically installed. You do have the opportunity *not* to install these, even if you are only using **Easy Install**; however, please note that you won't be able to work without them if you're using Digidesign hardware.

Whatever you do, a backup of the supplied Digidesign files will be placed in a separate folder, which is then automatically placed within the LOGIC Audio folder.

The Installer also handles the installation of Sound Manager 3.0, which is needed for AV Operation of LOGIC Audio.
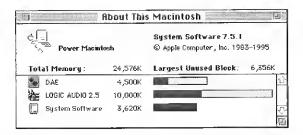
Minimum requirements

If for any reason, you want to work with older software versions, here are the oldest possible software revisions required for DAE operation of LOGIC Audio:

- Digidesign System Init; version 2.4 and up,
- DAE (the Digidesign Audio Engine); version 1.02 and up.

Memory allocation

The memory display in the Mac Finder will tell you at a glance how much memory is left free for use. Select **About this Macintosh** under the menu.

```
╔═══════════════════ About This Macintosh ═══════════════════╗
║                                                              ║
║   ⌐|.|                     System Software 7.5.1             ║
║      Power Macintosh       © Apple Computer, Inc. 1983–1995  ║
║                                                              ║
║  Total Memory :   24,576K   Largest Unused Block:   6,856K   ║
║     DAE            4,500K    ▓▓▓▓▓▓▓                          ║
║     LOGIC AUDIO 2.5  10,000K ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓               ║
║     System Software  3,620K  ▓▓▓▓▓                           ║
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The memory allocated to any application can be adjusted by clicking on the relevant application's icon and hitting ⌘ⓘ together. You can't do this when the program is running; if it is, you have to quit out of it first. Type in a new memory size under *Preferred Size*.
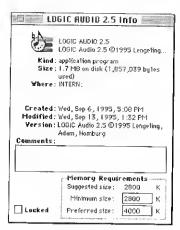
Allow LOGIC Audio as much memory as you can afford. The more memory LOGIC Audio has to run in, the better it will perform.

Installing Extensions

You have to have installed LOGIC Audio successfully before you can install a software Extension.

If you *have* managed that OK, select **File > Preferences > Audio Extensions**. The *Install* switches displayed behind the relevant abbreviations control the installation of the various Extensions.

Then follow the instructions in the dialog windows.

Booting Up For The First Time

Power-up sequence

Unless stated otherwise in your external hardware's manuals, you should turn on the connected components of your system in the following order:

- external hard drive(s)

- external hardware, for example a Digidesign audio interface or Yamaha CBX-D3.

- MIDI equipment, for example MIDI interfaces with their own power supply.

- your monitor(s).

- your computer.

In general it's OK to switch on your whole system via a single mains switch.

Power spikes are generated by some systems when the current is turned on or off, and these can damage your loudspeakers. For safety's sake, you should ensure that the master volume is turned right down on your amplifier when you switch power on or off.

Booting up LOGIC Audio

You boot up LOGIC Audio in the usual way; insert the hand crank into the slot beneath the Audio Engine and turn swiftly two or three times... OK, OK, it's not quite like that any more; just double-click on the LOGIC Audio icon, or choose Start > Program > LOGIC Audio and hit ⌘Ⓞ together. Alternatively you can start LOGIC Audio by double-clicking a LOGIC Song.

Calibration

When you boot up LOGIC Audio for the first time successfully, the program carries out a quick and automatic self-calibration. This can take up to a minute, but don't get disheartened; the program only ever does this once, following installation.

Chapter 2
Introduction

This chapter explains the operation and basic structure of LOGIC Audio without going into too much detail. The following chapters contain only brief descriptions of LOGIC Audio's extremely extensive functions. This chapter should help you understand these shorter descriptions more easily, and leave you ready to start work right away.

What we've assumed

We've assumed in this intro that you're familiar with the basic operation of LOGIC and the conventions of this manual. If this is *not* the case, please read the Crash Course and the first section of the *Operation* Chapter of the LOGIC manual.

We recommend that first-time LOGIC users work a while with the MIDI-   Important
only part of the program. One of the great things about an integrated MIDI and Audio sequencing system like LOGIC Audio is that you can manipulate MIDI and Audio recordings together. So if you can handle MIDI sequences OK, you'll be able to carry out many operations totally intuitively when you move to working with Audio sequences.

One small point - from here on in, when we mention 'Recordings', we always mean *Audio* recordings, not MIDI recordings.

2.1   How it works - and a few concepts explained

This brief overview is not about the technical side of Hard Disk Recording. If that's what you're after, you're reading the wrong manual! This section explains how you go about making and managing recordings with the help of the various parts of LOGIC Audio.

Audio Files

Any audio signals you record with LOGIC Audio (like vocals or acoustic instruments) are stored as **Audio Files** on your hard disk.

You can make use of existing AIFF or SD II type audio files in LOGIC Audio, including recordings made using other programs.

Audio files normally remain unaltered on your hard drive — even if you edit the recording so that only small snippets of it play back. As the audio file on the hard drive remains unchanged, you can undo any cuts you have made to the recording at any later stage.

This is called non-destructive editing.

Regions

When you edit non-destructively, you don't cut the audio file itself — you just change what we call **"regions"**. These are just parts of the original audio file.

The audio file itself is not affected when you define the regions. The "definition data" of the regions are part of the "song data", not part of the audio files.

When you make a new recording, LOGIC Audio automatically creates one region for the whole of the new audio file.

Regions can be defined in the Audio window or the Sample Edit window; they are also created automatically whenever you cut the recording in the Arrange window.

You can create or destroy as many new regions for an audio file as you like, without changing the audio file itself in any way.

In addition to the start and end points of a region there is another important point: the anchor.

The Anchor

The anchor is a freely-movable point in a region which you can use to mark a position in a recording, for example, a particular bar number, or a prominent noise. This marker then acts as a useful reference point if you're musically arranging regions, or synchronizing them to picture.

In other words, when you position a region in the Arrangement it is not the start point but the anchor which is aligned to a musical time point or cue point.

In both the Audio and Sample Edit windows, the anchor appears as a triangle under the audio waveform display. You can alter it by moving the triangle. However, the start point of a region is always fixed.

The location of the anchor is always displayed by the position indicator of an audio sequence in the Event List (or, when you're moving a sequence, within the Info line in the Arrange Window).

The Audio Window

The Audio window is used **to manage all the audio files** stored on your hard drive.

Among other uses, you can use the Audio window to:

- decide where your recordings will be stored (which hard disk, folder and file name),
- import existing audio files into the song, and
- copy, erase or rename audio files, and move them between different hard drives (or folders).

LOGIC Audio files appear in the Finder like other ordinary computer files, so you might think you can simply rename them here. You can do this, of course, but it's not recommended because if you do rename an audio file in the Finder, LOGIC Audio will continue to look for it under the old file name, and won't be able to find it!   Note

Apart from the uses mentioned above, the Audio window also provides you with **an overview of the number and positions of all the regions** associated with each audio file.

You can:

- change the start and end points of existing Regions;
- create and erase Regions;
- and change the Anchor for any Region.

Audio Sequences

Regions that are put together using the **Arrange Window are** called "audio sequences". This term allows you to distinguish between;

- Midi sequences in the Arrange window, and

- Regions in the Audio window.

If you are familiar with samplers you can think of these audio sequences as being graphically arranged samples.

For every audio sequence in the Arrange window, there's a corresponding region in the Audio window. However, not every region in the Audio window has to be used in your arrangement!

So, the Audio window is like your catalog for all your audio sequences (or regions, if you prefer to call them that), while the Arrange window is used to place these audio sequences on a time axis in such a way that makes musical sense.

You can drag regions straight from the Audio window into the Arrange window if you wish — they then appear there as audio sequences.

You don't *have* to define or alter regions using the Audio window the whole time. For example, every time you record in the Arrange window, an audio sequence is created containing the entire audio file (the corresponding region appears simultaneously in the Audio window).

If you cut up an audio sequence in the Arrange window using the scissor tool, you end up with two smaller sequences, as you would expect; but doing this also automatically creates two new regions in the Audio window.

The original region is not erased by this process, it just gets replaced in the Arrange window display by the two new audio sequences.

Audio Tracks

When you play back MIDI sequences with LOGIC, it's done via an Instrument (or, more accurately, via an object in the Environment window) which you assign in the relevant line of the track column of the Arrange window.

It's pretty much the same with audio sequences, except you choose an Audio object as the "track instrument".

Any track can play back audio sequences, provided an **Audio Object** has been assigned to the track i n the track column.

Audio Objects

Each audio object represents **one of the tracks** of your hard disk recording hardware. You control all the audio objects from the Environment window.

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You can picture each of these tracks (which we'll call "physical tracks" from now on) as being rather like a single voice on a sampler. An 8-track system like AudioMedia III, for example, can play back up to eight audio sequences at once.

However, you can set up as many other audio tracks as you like in the Arrange window, independent of the number of physical tracks available to you. These other tracks are often referred to as "virtual tracks".

Although you can assign various audio tracks to play back via the same audio object, you can only play back one of the audio sequences on these tracks at once!

For a single ProTools III system with 16 voices (or physical tracks), you need 16 audio objects in the Environment window.

Whenever you create a new song (⌥⌘N), LOGIC Audio automatically generates an audio object for every physical track of your audio hardware!

You also determine the following with each audio object:

• which physical output on your hardware is used to output the content of a given track, (providing the audio hardware has more than a stereo output),

• the output level, pan position and - depending on your hardware - possibly also the EQ and Effects settings of a given track.

Control over the last of these parameters can be automated very simply, because at the end of the day, it's simple MIDI controller information that governs the way audio objects work. Of course, such controller-driven automation data can then be processed very easily by LOGIC's extensive editing facilities, giving you total control.

The Sample Edit Window

You can carry out a number of tasks in the Sample Edit window by making use of its magnified depiction of your recorded audio waveforms. You can also select portions of your Audio Files and destructively edit them, or create new regions from them.

There are various editing functions available: ranging from reversing and normalizing (maximizing the level) to the high end functions of the Digital Factory™, such as digital compression (Energizer), time stretching or pitch shifting (Time and Pitch Machine).

You can use the Undo function for all destructive editing processes. As a precaution, you can automatically create backups before carrying out destructive functions.

2.2   Going about the Basics

This section explains how to tackle some of the basic steps when working with LOGIC Audio, and points you forward to the detailed descriptions of the program's functions contained in later chapters.

Making a Recording

First connect a sound source to the audio inputs of your system (a CD player will do for test purposes).

If you have problems, please refer to the manual supplied with your hard disk recording hardware.

Setting the Record path

Open up the Audio window (⌘⑨) and select **File > Set Record Path**.

From the selection box that now appears, choose a record path and name for all the recordings (i.e. audio files) you're about to make.

You **don't** need to repeat this procedure before all your subsequent recordings as they are all automatically given the same name and numbered sequentially to distinguish them from one another.

You can rename audio files after recording by double-clicking on their names in the audio window (though remember, **only** in the audio window, not in the Finder!).

When you're choosing a record path, bear in mind that hardware with its own SCSI bus can usually only record on disk drives connected to that SCSI bus. For example, you can't record on to the internal drive of your Macintosh using Pro Tools III hardware!

If you forget to set a path, LOGIC Audio will let you know with a dialogue box. At this point you can then select the *Set Path option* to bring up the record path selection box direct.
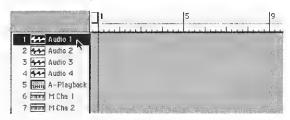
The chosen path is then stored in the Preferences – this means it will automatically be available the next time you start the program.

Logic

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Select an Audio Track

Select an audio track in the Arrange window.

To change a track *into* an audio track, assign an audio object as an Instrument to the track, by means of the track column.

Whenever you create a new Song by selecting (⌨-)**File > New** , you'll find that a track has already been generated for all available audio objects.

To enhance an existing Song with audio tracks, first set up some audio objects in the Song's Environment. For more on how to do this, please read the section *Audio Objects,* on page 3 - 2 .

"Arming" tracks

The tracks in a piece of hard disk recording hardware (unlike tracks in MIDI recording) have to be manually prepared for recording before you can actually use them, just as you have to "arm" the tracks of a multi-track tape recorder.

Double-click on the audio object in the track column to open an environment window. The audio objects layer should now be visible.

There's a *REC* switch at the bottom of every audio object. You use this switch to arm the track represented by any particular audio object.

REC

Tracks can also be armed directly from the Arrange window, by ⇧⌘-clicking on the appropriate audio object in the track column.

In both cases, several tracks can be armed at once.

Create a new screenset. Open the Arrange window plus an Environment window containing the audio objects as a float window (⌨⌘8). Set the window size so that you can see just the audio objects, Use this screenset for recording from now on. The advantage is that you can always see your audio objects, even when you make changes to the Arrange window.

Tip

Stereo Usage

To record in stereo, click in one of the audio objects on this symbol. This pairs two neighbouring tracks and puts them together under the control of whichever audio object has the lower odd number. The symbol then changes into a stereo symbol.

The audio object for the even-numbered channel cannot be removed from the Environment, as the track it represents is now being used as the right-hand stereo channel.

Setting Levels

As soon as you arm the tracks, you should hear the input signal you are going to record at the output of your hard disk recording hardware.

You can now adjust the level of this monitor signal using the fader on the audio object. The fader always adjusts the playback level, not the record level. With AV Macs, your choice is limited to simple monitor "on" or "off" settings.

You can adjust the record level with the subgroup fader on your mixer, or by adjusting whatever you're using as a signal source. In addition, some hardware permits adjustment of the input level; more on this in the section describing the various hardware extensions.

The record level of digital inputs cannot be adjusted manually (1:1 transfer).

Starting the Recording

You start recording by clicking the record button in the Transport window or via the relevant key command.

While recording, the waveform (signal envelope) is displayed in the Arrange window in real time.

Keep an eye on the level meters in the audio objects. If the Clip display (top LED) lights up, repeat the recording at a lower level. So you don't have to watch the level meters the whole time, the Clip LED, once activated, will remain lit until you click on the meter a second time.

Don't forget to disarm your audio tracks after recording, either by ⌂⌘-clicking on the track instrument or using the REC switch on the audio objects.

Basic Management of Your Recorded Audio

During the recording, the audio sequences should have appeared in the Arrange window. You can now manipulate these in almost exactly the same way as you would MIDI sequences. For example:

- you can move them by dragging and dropping them with the mouse;
- you can cut them with the scissor tool;
- you can copy them by moving them with the ⌥-key depressed (this creates a new region in the Audio window);
- if you copy them by moving them with the ⇧⌥-keys depressed, this creates a new audio sequence with the same region;
- you can set loop and delay parameters for them in the sequence parameter box.
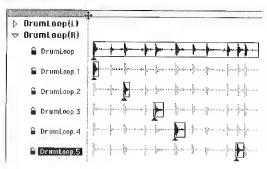
The copy-functions are definitely the most important:

When you copy an audio sequence in the normal way (i.e.: by ⌥-moving it), you are effectively creating an alias, because the same region is being played again. Any alterations you make to a region/sequence automatically affect all the copies.

If you hold down the ⇧-key when copying audio sequences (hold down ⇧⌥ while dragging an audio sequence), you automatically create a new region. You can now edit and trim the new audio sequence without changing the original audio sequence (region).

The Audio Window

To get an overview of all audio files and regions, open the Audio window, (using ⌘⑨ or **Windows > Open Audio**).

Audio files are displayed in the audio window as folders preceded by a triangle, rather like the Finder-display "as Name". Clicking on the trian-

gle hides or shows the regions defined in the selected file, displaying these in the lines below. The right-hand side of the window shows the overall position of the regions in the whole file.

Regions

You add a new region by selecting **File > Add Region** . The position of the newly-added region depends on the region selected.

To hear a region play, just click on it and hold the mouse button down.

To change the position of a region, you grab it by its lower half. Grabbing it at the left or right end allows you to move the beginning or end, while if you grab it in the middle, you can change the whole position of the region in the audio file. The position of the anchor can be altered by moving the triangle in the lower half of the region.

Changing the start and end points of the regions has an immediate effect on the regions' corresponding audio sequences in the Arrange window!

The Sample Edit Window

You can edit regions with even greater accuracy in the Sample Edit window. This is opened by double-clicking on a region (or an audio sequence in the Arrange window), or pressing ⌘⓪.

Changes made always affect the selected area of the audio file only. Clicking on a region not only opens the Sample Edit window but also selects that region automatically for editing when the window opens.

You make selections by clicking and dragging with the mouse, and you can change the existing start and end points of selected regions by ⇪-clicking on them and dragging. Selecting the menu entry **Edit > Search Zero Crossings** permits only Zero Crossing points as possible start or end points for selections. This feature can be turned Off and On by ticking the menu entry with the mouse.

When you've finished editing a selection, you make the changes to the regions' boundaries by selecting **Edit > Selection to Region** .

There are simpler editing functions in the **Functions** menu, and more complex ones under the **Factory** menu.

Automation

To automate adjustments made to level, pan and — if your hardware supports it— EQ settings, do the following:

- select a track in the Arrange window assigned to the instrument *A-Playback;*

- hit record;

- make the adjustments you want on the audio objects in the Environment.

The adjustments are then recorded as MIDI controller data, and can be edited using Hyper Draw or in the Hyper Editor.

Summary

So, here's a quick summary of how to set about making a recording:

- **Set the path and name for the audio file.**
  Open the Audio window (⌘⑨) and choose **File > Set Record Path**.

- **Set up an audio track in the Arrange window and select it.**
  Assign an audio object in the track column.

- **Open the Environments audio layer:**
  by selecting **Options > Audio Record** from the Audio window or by double-clicking on the audio object in the track column.

- **"Arm" the physical tracks:**
  by clicking on the *REC* switch on the audio objects.

- **Start recording:**
  using RECORD, as with Midi recordings.

- **"Disarm" the physical tracks** (make the tracks "safe").

Audio files and regions can be manipulated in the Audio window; fine-tuning and destructive editing can be performed in the Sample Edit window.

2.3   General Points

Tempo and Time

Digital audio recordings have a fixed relationship to Time – their sampling rate. If you change the tempo of your sequencer, the length of an audio sequence will also change relative to the rest of your (non-digital audio-based) music. The reason is that the playback time of the audio sequence remains the same, and its unchanging duration against different sequencer tempos forces it to have a different relative length. At the end of the day, the sequencer is concerned with lengths in bars and beats.

For this reason, you should choose your tempo at the start of a recording session with care, for without things getting really complex, you won't be able to change it later without your audio tracks getting out of time with the rest of your backing.

Setting the Song Tempo to match the Recording

Let's assume you've recorded a drum loop. Now you'd like to set the Song tempo to fit the recording exactly.

- First check that the drum loop is smoothly edited.
    - To do this double-click on the audio sequence to open the sample editor, and activate the looping switch and the sample playback monitor.
    - Adjust the start and end points of the drum loop waveform (by ⌂-clicking and dragging the mouse), so that the drum-loop cycles round. Then select **Edit > Selection to Region**.
    - Close the Sample Editor (⌘⑦), and OK the computer's query when it asks whether you want to keep the changes you've made.

- In the Arrange window, move the audio sequence to the start of a bar (e.g. Bar 1).

- Stretch the locators from the beginning of the same bar across a region that matches the exact length of the drum loop; e.g. across two bars (from 1.1.1.1 to 3.1.1.1).

- Select the menu function **Functions > Adjust Tempo by Object Length and Locators**.

The tempo is automatically adjusted so that the length of the Audio se-
quence matches that of the 2-bar cycle exactly.

Hit STOP, then START to hear the results.

Pressing STOP doesn't just put the Song position line back to the start   Note
of the 2-bar cycle, it also prepares all the audio sequences that are
timed to start there for immediate playback. Without this precaution
(for technical reasons), several seconds could pass after pressing START
before all the audio sequences were running in time with the rest of the
Song.

Changing the Recording to fit the Song

You should only attempt the opposite of the above procedure, and try
to fit an existing recording to the Song tempo, when a change to the
tempo is no longer possible, as all these edits involve altering the orig-
inal recording in some way.

With rhythmic material, you can achieve the necessary match in the
following way:

- Make the tempo match temporarily;
- Cut the audio sequence into small segments automatically with
  the help of the Strip Silence function.
- adjust the original tempo again.

For more about this method, read the section *Special Features of Ster-
eo Files,* on page 5 - 35.

You can match *any* recordings using the Time & Pitch Machine in the
Sample Editor. For more on this, read the section *Time Machine,* on
page 7 - 3.

Data Formats: what you need to know

Regions and the SDII Data format

Audio files are stored in the (mono) SDII format. "SDII" stands for
SoundDesigner II, a piece of Digidesign software for manipulating one-
or two-track digital audio. LOGIC Audio is also capable of playing audio
files in the AIFF (Audio Interchange File Format) format. This is the offi-
cial Apple standard for audio files.

As well as the audio file itself, the SDII format contains information
about the bit resolution and sampling rate, and a list (which can be as
long as you like) of region definitions.

With the help of this, regions defined in one application can still be made accessible to another.

However, regions created in LOGIC Audio are stored independently of the Song. The reason for this lies in the principle of non-destructive editing: that an audio file should remain unchanged by editing. The definitions in an SDII file can be used for a playlist in SoundDesigner II.

So that region definitions created in LOGIC could be swapped with those stored in SDII files (and vice versa), it is possible both to import region definitions from SDII files into LOGIC Songs, and export regions defined in LOGIC Audio into SDII files. For more information on this, read the section *Dealing with SDII Files*, on page 5 - 36.

Sample Rate and Bit Resolution

As with all other comparable multitrack HD systems, only audio files with a single sample rate can be played back within a LOGIC Audio Song. If you wish to integrate existing audio files with a differing sample rate, they will first need to be converted in the Sample Edit window by selecting the function **Factory > Sample Rate Convert...** .

LOGIC Audio can currently only play back 16-bit audio files. The use of lesser bit resolutions has an audible disadvantage for the quality of reproduced sound.

Chapter 3
Using Audio Objects in the Environment

The concept of the Environment is explained in the first part of the LOGIC handbook, as is its basic operation. The purpose of this section is to build on that knowledge, and explain the features that are specific to the Environment in LOGIC Audio.

3.1   Concept

Each audio object represents one track of your hard disk recording (HDR) hardware. It can also be used to control input or group signals.

The way audio objects look depends on the hard disk recording system you're using; they reflect specific functions of your hardware in their appearance.

For this reason, Audio objects have to be placed in the Environment — so that they can "talk" to your HDR hardware. It is recommended that you create a separate layer for audio objects.

When LOGIC Audio creates a **New Song** it contains the maximum possible number of audio objects that your hard disk recording setup will allow. The audio objects for this song are automatically given their own layer (called — you guessed it — *Audio*).

A quick reminder:
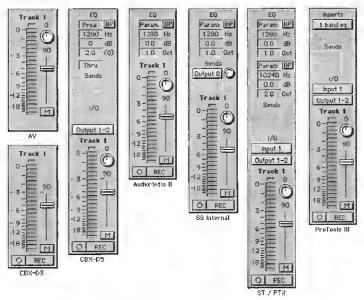
You open an Environment window by choosing **Windows > Open Environment** (⌘🖭). You can switch layers using the flip menu in the layer box (on the left, under the toolbox) and invent new ones with the ****Create**** entry in the same menu.

3.2 Audio Objects

Creating Audio Objects

Choose **New > Audio Object** and double-click the audio object which appears. You then determine which track of your hard disk recording system is controlled by this object with the *Cha* parameter in the object parameter box. The exact way it looks will vary according to the hard disk recording hardware the audio object is representing:

The audio objects shown here represent a track on the following kind of HDR hardware (from left to right):

- Mac AV mode, below it CBX-D3 (2 tracks with REC switch)
- CBX-D5 (up to 4 equalizer bands available)
- an AudioMedia II track, or one from a Session 8 in external mix mode (AudioMedia III has a broader EQ band)
- a track from a Session 8 in internal mix mode
- a SoundTools or ProTools II track
- a ProTools III track (more inserts and sends appear as necessary)

Erasing Audio Objects

You erase objects by selecting them (just click on their upper edge or on the name) and pressing ⌫. This sets the level of the track controlled by this object to zero.

The Object Parameter Box

3

If the Parameter column is visible (select **View** > **Parameters** if it's not), a box will appear in the column showing the parameters for the selected audio object. By clicking on the triangle at the top of this box next to the name, you can conceal or reveal its contents.

The name in the uppermost line of this box can be changed by double-clicking on it. The check box on the left next to the icon tells you whether the audio object will appear on the instrument selection menu in the Arrange window. You can even change the icon itself with a flip menu if you wish, although the preset one is usually suitable.

Dev

You use the *Device* parameter to select the hard disk recording system the audio object is connected to. You can only use different kinds of hardware at the same time if you have the right software extensions installed. The default setting here will be for one of the pieces of hard disk recording hardware you have installed; entries referring to hardware not connected to your system will appear 'grayed out'.

At present, the following settings are possible:

DAE   Digidesign hardware;
AV   Internal hardware of Macs with 16-Bit converters,
CBX   Yamaha CBX hardware.

Cha

The *Channel* parameter determines the **type and channel** of the signal controlled by an audio object.

You use this parameter to select which hard disk recording track an audio object will control; or, alternatively, you can set the audio object to control your recording hardware's inputs, outputs, or even – depending on your hardware – its aux sends or sub-group faders.

First, you choose the type (*what* the audio object will control; a track, an input, an output etc.) then a number (e.g. track 1, output 4, etc.). You make all your selections from a flip menu.

Track

selects the audio track number, from a total of however many tracks your hard disk system offers (4, 6, 8, 12 or 16, or, with combinations of hardware, up to 48). The *Cha* parameter selection *Track* is the usual setting for an audio object, making a *Track* object.

Input

allows you to monitor signals connected to your hardware's inputs. This can also be done via *Track* objects, provided the REC track arming switch is active. *Input* objects are therefore usually used to mix in external signals (like effects returns) via the system inputs at mixdown.

Please note that *Input* objects are not always available — it depends on the hardware you have connected!

Output

If you select this option, the audio object will control one of your hard disk recording system's outputs. You can then set the output level from this object, no matter what track, aux send or input is connected to the output the audio object is controlling.

Stereo Objects

At the bottom of the list in the *Cha* flip menu all the items are repeated in pairs, e.g. *Track 1-2*. This allows you to switch the object to stereo mode. Any other mono objects can then be remote-controlled from this stereo object. For details see section *Stereo Objects*, on page 3 - 8.

Note   If you are using **TDM-Hardware** (with ProTools III), you may be able to select other parameters under the *Channel* setting.

Tip   It is of course entirely possible to define several objects that relate to the same channel. If you have a system with a lot of tracks but a small monitor, you could have trouble seeing all your tracks at once. To get around this, you could create a new layer to exist in parallel with the one showing tracks 1 to 16. You could, for example, design a layer showing just channels 3, 5, and 14, input 5, and outputs 1 and 2!

When you select audio object types, you'll notice the following text styles are used:

Outline: This indicates that the object is not available, and happens when a song has been produced on a system with more tracks than yours (for example track 9 on an 8-track system).

Normal: This is used for objects that haven't been defined in the Environment yet, and which aren't therefore in

use.

Bold: Objects in bold have been defined in the Environment, and are in use.

Bullet point (" • ") in front of name:

means that the mono-object indicated is not available, as it is in use as part of a stereo object.

MIDI Cha

You use the *MIDI Channel* parameter to determine which MIDI channel the audio object will receive MIDI information on. You can then control the audio object remotely using MIDI controller information if you wish.

This also works the other way around; once a MIDI channel number has been set, you can *generate* controller information on this MIDI channel by moving the sliders and knobs on the audio object itself.

When the Channel parameter is set, the MIDI channel is automatically set to the same number, as this usually makes things a bit easier to remember!

For more information about MIDI remote control, take a look at the section *Automation*, on page 3 - 12.

Val as

You use the parameter *Value as* to select whether the scale of the fader on the audio object is given as

Num   a numerical value from 0 to 127, or

dB   as a value in decibels.

The numerical value 90 is equivalent to 0 dB.

Meters and Controls

Level Meter

Some audio objects have a level meter for displaying playback or monitor level.

> NOTE: the Yamaha CBX hardware does not supply LOGIC Audio with information about levels of any kind; please refer to the meters on the hardware itself. Please also note that the meters are not 100% accurate when using internal AV/ PPC hardware.

When you arm a track in readiness for recording , the meter will display the input level.

The playback level is also displayed in the Arrange window to the left of the track number, provided you select **View > Hide/Show Track Numbers/Level Meters**.

Peak Hold

As with conventional desk meters, peak values are "held" on the display for a few seconds so that they can be read more easily.

Clip Detector

If the signal overloads and goes into clipping, the Clip detector(the red "virtual LED" at the top of the meter) will light and remain lit. You can reset the detector by clicking anywhere on the meter.

Adjusting the level

The fader on track objects sets the playback level. The monitor level is controlled when the track is armed.

The level reading of the audio objects and the aux sends can be shown in decibels (dB) or MIDI controller values. To change the scale, select the appropriate object and alter the "Val as" parameter. MIDI volume reading 90 is equivalent to 0 dB.

A small line to the left of the fader indicates the 0 dB position. The fader ranges up from this point to 6dB, and down to complete silence.

You can reset the volume fader to 0dB (90) with a ⌥-click.

... via Key Commands

The global key command *Toggle (Mute) Audio Tracks* switches the levels of all audio objects between two different positions. All levels can be set in either of these positions.

In the same way you can use the global key commands *Toggle (Mute) Audio Inputs* and *Toggle (Mute) Audio Outputs* to switch between the levels of all input or output objects.

Toggle (Mute) Audio Aux and *Toggle (Mute) Audio Bus* have the equivalent effect on the Aux and Bus objects in a TDM system.

Mute control

You can mute any audio object by pressing the button marked "M". Pressing the button again restores the original level.

Logic AUDIO

3

Pan/Balance control

Mono objects feature a Pan control which determines the position of a signal in the stereo image.

> NOTE: panning is not possible if you are using the Yamaha CBX hardware, as each track is "tied" to a fixed output!

Stereo objects, on the other hand, possess Balance controls. The balance control differs from the pan control in that the former controls the relative levels of *two* signals (L/R) at their outputs, while the latter merely shares one signal proportionally between two outputs.

You can reset the pan control to center (64) with a ⌥-click.

EQ

Please note that the availability and extent of the EQ facilities depends on the hardware you are using. If you are using internal AV hardware, for example, or a Yamaha CBX-D3, you will not have access to EQ at all. With ProTools II or AudioMedia III hardware, on the other hand, you can control up to two frequency bands, and with a CBX-D5, up to four.

BP the Bypass switch in the top right turns the EQ band off.
Typ next to the BP switch you can use a flip menu to select the type of EQ (Thru, Low/High Shelf, Parametric, Low/Highpass Filter)
Hz mid frequency (*20 Hz – 32,4 kHz*) or cutoff frequency
dB cut/boost (*-12 – +11,8 dB*) – (n/a for filter)
Oct bandwidth (*0,1 – 3,0 octaves*) – (n/a for filter and shelf)

If your HDR hardware allows several EQ bands the type flip menu of the next band is always visible so that you can include it.

EQ adjustments can be stored and played back over MIDI (see the section *Automation*, on page 3 - 12, for more details).

Aux Sends

The Aux sends allow you to send a portion of any signal out of the signal's audio object to an internal bus or auxiliary output. The aux send routing options available vary depending on the hardware you are using.

> NOTE: the CBX-D3, AudioMedia and Session 8 hardware (in external mix mode), and AV objects offer no aux send facilities!

Click on a Send area of the mixer strip and choose one of the possible send destinations using the flip menu that appears (or turn off the current selection by choosing *No Send*). When you have chosen the send

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destination, you can regulate the amount of signal supplied to the send using the Send Amount *knob* control.

You can reset the Aux sends to 0dB (90) with a ⌥-click.

Note   Audio objects for TDM hardware offer further controls for their insert points. Please refer to the section on the TDM extension.

Track arming

REC

The Rec control (see right) "arms" a track, making it ready for recording. Once the track has been armed, the control flashes red. During actual recording, it remains lit red all the time.

If the control is flashing but gray-red in color, no audio track has been selected in the Arrange window. No recording can take place.

Rec controls only exist for Track objects. Please note that the number of Track objects with a Rec control is limited to the number of tracks which your HDR hardware can record simultaneously.

Stereo Objects

All the types of audio objects (Track, Input, and Output) may be used as stereo pairs. For example, tracks 1 and 2 can be combined into a Stereo Object *Track 1-2*.

Audio sequences on the tracks of a stereo object are always dealt with together, no matter what the operation being performed. If you open the Sample Edit window, both sides of the stereo pair are shown there and processed together.
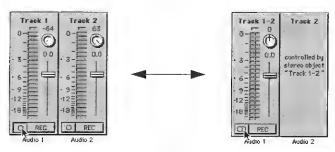
Creating Stereo Objects

To do this, select the object named *Audio 1* (click on its name, at the bottom). In the parameter box on the left, select *Track 1-2* under the *Cha* parameter instead of *Track 1*.

Alternatively, you can click on the Mono symbol on the left of the object, next to the REC button.

The object *Track 2* is joined to *Track 1*, conceals its contents, and indicates with a short piece of text on its surface that it is now controlled by the stereo object *Track 1-2*.

However, a click on the stereo symbol (see left) to the left of the REC control converts the stereo object (and the audio object it controls) back into two independent mono objects.

The Effects

Whatever parameters you adjust for this object, the changes affect both tracks equally. LOGIC Audio selects pan positions for the two tracks automatically — hard left and hard right respectively. The pan control becomes a balance control, and the auxiliaries, EQ and insert points (on TDM hardware only) operate in stereo.

Stereo objects have their own set of parameters for setting level, balance aux send and EQ (and with TDM hardware, insert points as well). As a result, you can toggle between stereo and mono object types without losing the parameters for each type.

Any combination of stereo and mono recordings is permitted; you can combine tracks 1 and 2 as a stereo pair and use tracks 3 and 4 for mono recording s if you wish.

Please note that for stereo recording in the Arrange window, the audio objects for both sides must be arranged one beneath the otherl

The second, an apparently empty object cannot be deleted as long as it remains in stereo operation, as it is functioning as the right half of the stereo pair, and is needed to play back the right-hand signal. However, the orientation of the paired objects can be changed in any way you like; they don't have to remain next to each other, and the dependent
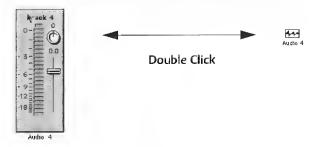
Note

object can be switched back to being an icon in appearance if you wish (see below).

Functions

Icon representation

Double-clicking on the upper edge of an audio object changes its appearance from that of a large panel with graphic controls to a simple iconic representation.

Double-clicking on the icon converts it back to its larger, graphic form. This is a good way of modernizing the iconic look of Songs created on older versions of LOGIC Audio if you want to update them.

Double Click

Scaling Objects

Clicking in the bottom right-hand side of an object and dragging with the mouse button held down allows you to change the size of the object. You then see the various available sizes as you drag.

The dB scale on the left of the Audio Object will disappear once the object is below a certain size. With the option **Preferences > Audio >** *Audio Object with dB scale as default* set to "on", clicking on a iconized view of an Audio Object will result in the smallest possible object size, with dB scale intact.

Depending on the object size, the labelling will be abbreviated. For Example:

Track 11-12 will become *Trk11-12*
Output 13-14 becomes simply *13-14*
Bus 15-16 becomes *B15-16*.

The same is true for the labelling of TDM Plug-Ins.

3

If you wish to resize several objects at once, do the following:

- Resize one object;

- Select just this object;

- Select **Edit** > **Copy** (or hit ⌘☐);

- Rubber-band all the objects you want to resize;

- Select the function **Options** > **Apply Buffer Template to** > **Size** .

For more detailed information, please read the section on *Object groups* in the *Environment* chapter.

Color

You can assign a color to selected Audio Objects with **View** > **Object Colors**.

This color will be assigned to recorded Audio Sequences. If you prefer to see this color on the surface of the Audio Objects in the Environment, activate the option **Preferences** > **Audio** > *Colored Audio Objects*.

Songs on different kinds of hardware

If you've recorded a song on (say) a 16-track Pro Tools system, and you wish to work on it further on an 4-track AudioMedia II-based system, you'll only have access to the firs t four tracks, and will no longer be able to see the aux sends and the insert points. Tracks 5 to 16 appear as "empty" objects. Nevertheless, you *can* carry on working with the AudioMedia II system, and still return to your larger system later. All of the larger system's options such as the various Inserts, Sends etc. will be restored to the audio objects automatically.

Audio Configuration Window

You can open this window from the Audio Window by choosing **Options** > **Audio Configuration**. Here you can control all the routing settings (inserts etc.) for the song – even if the required HDR hardware is not currently installed. You can use the local **Edit** menu to switch between the different hardware.

3.3   Automation

On a mixing desk, automation is the ability to record the changes to the levels of the various audio channels over time, and then recall and reproduce these changes automatically when mixing.

"Full" automation allows you to recall the adjustments to *all* of the parameters on a desk such as the pan and EQ settings as well as all the channel levels.

Naturally, the "virtual" mixing desks in LOGIC Audio's Environment are all fully automated consoles.

Concept

When you move the graphically represented controls (faders, switches, knobs etc.) on the audio objects with the mouse, you generate MIDI controller information, which can be recorded on a separate MIDI channel.

If you then play these MIDI controller events back to the audio object, the controls will move in exactly the same way as when the controller information was recorded, and of course, the effect of these moving controls will be the same.

The controller events can then be manipulated in the Event List Editor, just like any other events. Alternatively, you can *create* automated control sequences graphically by using Hyper Draw or the Hyper Editor.

Instead of using the faders on the audio objects themselves, you can use fader objects to generate the MIDI controller events. This approach has the advantage that you are not dependent on the default graphical arrangement of the audio objects' controls as you can easily create your own mixing control surface and tailor it to your specific needs.

Signal Flow

Automating the mixer is similar to recording the movements of ordinary fader objects in the Environment.
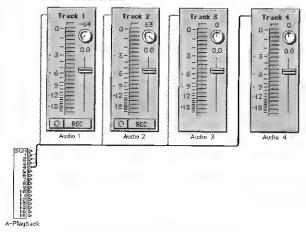
Playback Instrument ("Mixer Object")

To record the movements of the controls, you need an object which will act as a track instrument in the Arrange window. A channel splitter is the obvious choice.

Start by connecting up the individual channel splitter outputs with the 'matching' audio objects. By "matching", we mean that the MIDI channel of each splitter output should be the same as the MIDI Cha setting in the parameter box of each audio object.

So Channel Splitter Output 1 is linked to Track 1's audio object, splitter output 2 to track 2's object, etc. (assuming of course that you haven't altered the default values given to the MIDI Cha parameter before you do this).

The channel splitter is always present when you select a **New Song** and is has the default title *A-Playback* (for "Audio Playback"). You can, of course, rename this object as you wish. For simplicity's sake, we'll keep this name the same for now.

In the above picture, you see an example of 4 audio objects cabled to the Channel Splitter with Channel 4's Output selected.

Signal path when using external Fader Objects

You can skip this section if you like!

If you'd rather just use level controls, or you'd like to rearrange the controls to suit your own liking, you can create your own custom control surfaces.

You can do this because every function of an audio object (e.g. level, pan and EQ controls) can be controlled by an *external* fader object.
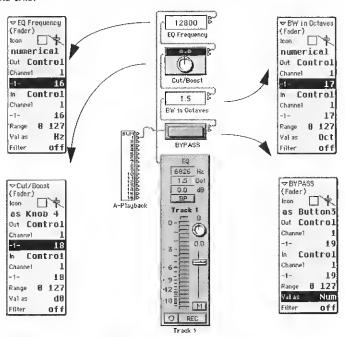
To do this, these fader objects have to be able to send MIDI controller information (Out definition), and be 'remote-controlled' by the same MIDI info when it is received (In definition).

You'll find out which MIDI control numbers you use to control the various audio object controls in the section *Which Controller Numbers?*, on page 3 - 15. The next section describes the signal path you need to set up.

Connect the output of the fader objects you want to use to the audio object.

With a setup like this, you need to connect an *A-Playback* instrument (as described above) in order to record all the movements you make. The required setup for one 'channel strip' could something look like this:

The *A-Playback* (channel splitter) output is connected to one of the fader objects, which is then connected serially to all the remaining faders in turn, finally reaching the *Track 1* audio object.

The above diagram also shows the parameter boxes for the various fader objects, so you can take a closer look at the selected parameters if you like (applies to AudioMedia II).

Which Controller Numbers?

The functions available to you depend on the hardware you're using. Whatever you're running, you'll have control over level and pan, but the EQ and aux sends will only be available to hardware that is suitably equipped.

Controller Number	Meaning	Controller Number	Meaning
7	Volume	28	Send 1
8	Balance (only for Stereo Objects)	29	Send 2
9	Mute	30	Send 3
10	Panorama	31	Send 4
16	EQ #1 Frequency	32	Send 5
17	EQ #1 Bandwidth	33	Send 6
18	EQ #1 Gain	34	Send 7
19	EQ #1 Bypass	35	Send 8
20	EQ #2 Frequency	64 - 79	Plug In #1
21	EQ #2 Bandwidth	80 - 95	Plug-In #2
22	EQ #2 Gain	96 - 111	Plug-In #3
23	EQ #2 Bypass	112 - 127	Plug-In #4
24	Cue – Session 8		

Please note that the descriptions given here are also shown in the Event List if the hardware you're using has the relevant function.

Examples:

With AV LOGIC Audio shows *Volume* and *Pan/Balance*.

With CBX LOGIC Audio shows only *Volume* (plus *Pan/Balance* if it is a stereo recording).

With AM II LOGIC Audio shows *Volume*, *Pan/Balance* and *EQ1...* .

With PTII LOGIC Audio shows *Volume*, *Pan/Balance*, *EQ1...*, *EQ2...* and *Sends*.

With PTIII LOGIC Audio shows *Volume*, *Pan/Balance*, *Sends* and *Plug-In...* .

For ProTools III users:

For details on the automation of Plug-Ins please refer to the section on the TDM Extension.

Snapshot Record

- Select an "A-Playback" track,

- at the desired song position go into Record/Pause,

- select the relevant audio object in the Environment,

- Choose **Options > Send Selected Fader Values**.

All the relevant controllers will now have been recorded.

Real-time Record

To record the adjustments made to audio object controls (or the faders of a custom "virtual mixer") in real time, you have to set up the *A-Playback* instrument in one track of the Arrange window.

Start by bringing the Environment window containing the audio objects to the front on your monitor. (Here's a quick tip: bring it up as a float window, by holding down 🖾 as you open it).

Start recording. As the song plays through, you can operate all the controls on your "virtual mixer", and all the adjustments you make will be recorded on the *A-Playback* track as MIDI controller events.

When you play the song back, you'll be able to just sit and watch as all your adjustments from the previous run-through are faithfully reproduced.

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Setting up Groups

You can move several faders at once by simply selecting the relevant objects (e.g. by ⬦-clicking them).

Erasing recorded Fader movements

Now and again, you'll need to erase the movements you've stored for a particular fader, and re-record them.

The Hyper Edit window can act as a really neat solution to hassles like these, although you do need to do some preparation, i.e. set up a Hyper Set containing the event definitions for all the controls you're using. For more about this, check out the chapter on using Hyper Edit in the first part of this manual.

Tip

If you don't have an appropriate hyper set at your disposal, do the following: open an Event List window (⌘🄩).

If you know the MIDI channel and control numbers of the fader, knob or switch you want to change:

- Select one of the events you wish to erase;
- choose **Edit > Select Similar Objects**;
- press the ⌫ key.

The MIDI channel containing the Controller information usually corresponds to the track number of the audio object (so the *Track 3* object generates MIDI controller events on MIDI channel 3 - unless you change its default value which is not recommended).

Volume fader adjustments generate controller #7 data, while moving the pan control sends controller #10 data.

If you *don't* know the MIDI channel or controller number for the fader, knob or switch you wish to edit:

- Set the Event List window to "Contents Link";
- Set the song position to the start of the sequence;
- hit PAUSE, then RECORD;
- move the control whose movements you want to edit.

The Event List window will then show all the events generated by this control.

- Hit STOP twice;
- deselect all the events in the Event List window;
- select all the events that have just appeared;
- choose **Edit > Select similar Objects**;

• hit the ⌨ key.

Viewing control adjustments graphically

If you need to make fader adjustments over a period of time so that they happen as evenly and smoothly as possible (for example, a fade in or out, or a panning operation), you're best off using Hyper Draw.

Hyper Draw is just another way of viewing MIDI sequences in the Event window. It depicts the course taken by a MIDI controller graphically. The controller curve is shown alongside the MIDI sequence, and can be edited with your mouse.

To use Hyper Draw to edit all the adjustments made to the audio object controls (or those of a custom "virtual mixer"), first set up a track in the Arrange window for the *A-Playback* instrument.

Create an empty sequence (if you don't already have one to hand) using the pencil tool.

Extend the sequence you've created so that it covers the whole period of time you want the control adjustment to happen in.
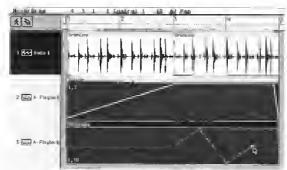
By selecting **Options > Hyper Draw > ...** you can now put this sequence into Hyper Draw mode. You use the first level of the Hyper Draw menu to select which controller you would like to show graphically, for example **Options > Hyper Draw > Volume**. If you select **Options > Hyper Draw > Other...** , a window appears in which you can enter any MIDI controller number you like, so that you can automate your EQ adjustments, for example. The controller numbers determine which fader, switch, or knob adjustments you want to edit, as explained in the section *Which Controller Numbers?,* on page 3 - 15.

You can also use **Options > Hyper Draw > Channel > ...** to set the MIDI channel of the events shown (as well as the new ones you create here by editing). The MIDI channel determines which channel of your virtual mixer you are editing.

The small numbers shown on the left-hand side of the above screen are the MIDI channel and MIDI controller numbers respectively. You can change the controller information shown at any time by selecting a sequence (just click on the row with its name) and choosing another from the **Options > Hyper Draw...** menu.

Editing is carried out by simply creating points with the mouse (which can also be deleted by re-clicking on them). LOGIC then joins up the

dots automatically using the optimum path to create a smooth flow of controller information.

Please note that you should use Hyper Draw at a sensible vertical zoom resolution. If the Hyper Draw display is too small, it won't be of much help to you.

You can store and recall three different *macro* zoom resolutions by means of keyboard commands. You may find it equally useful to store an enlarged version of the Arrange window as a screen set.

Note

In the above example, two different sequences have been set up for control of the Volume and Pan settings on Channel 1. Equally, however, you can govern the controllers for all of the parameters on all the tracks of your hard disk recording system from a single sequence if you wish to do so.

A more sensible compromise is to control all the parameters relating to each channel on separate tracks in the Arrange window. You can then change the selection of controller parameters that you want displayed for as many sequences as you care to select, while the tracks them-selves remain unchanged.

Chapter 4
Using Audio in the Arrange Window

4

4.1   Audio Sequences

Creating Audio Sequences

When you make a real-time recording, LOGIC Audio automatically creates audio sequences to represent what you record. It also places corresponding regions in the Audio window.

However, if you import an existing audio file recorded in either another application or Logic song, you will need to manually place the region into the Arrange window

To play back a region at a certain point in a song, you have to set up the region as an audio sequence in the Arrange window.

Open the Audio window and an Arrange window. Grab the region you want in the middle and pull it into the required position in the Arrange window.

A quick reminder: when you place audio sequences onto tracks, don't forget to allocate each track its own audio object (the "track instrument" of an audio track).

For more information about this, take a look at the section *Creating Audio Tracks,* on page 4 - 10.

Cutting Audio Sequences

When you cut an audio sequence using the scissors tool, you create two new regions. The original region remains unchanged in the audio window, and the new regions are numbered sequentially.

Please note: when you are selecting a cutting point with the scissor tool, you can move it backwards and forwards in steps of one division. If you need to be more accurate and require the maximum tick resolu-

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tion, press ⌨ after you have selected the sequence with the scissor point. To obtain the maximum resolution (ticks) press ⌨ as well. The scissors will now move in tick steps and will only cut after these keys are released.

If **Edit > Search Zero Crossings** is switched on in the Audio window the cutpoint is moved to the nearest zero crossing. The same applies to all other methods of altering the start or end-point of a region in the Arrange window.

Remember that this can cause the precise start-point and length of an audio sequence to differ from the chosen values.

Erasing Audio Sequences

Audio sequences can be erase by selecting them and pressing ⌨, or by clicking on them with the eraser tool.

When you erase an audio sequence that you created by making a new recording (since opening the song), LOGIC Audio will ask you if you also want to erase the Audio File that goes with the sequence. This is a good way to avoid using up unnecessary space on the hard drive, particularly in the case of recordings that have gone wrong.

If the song has just been loaded this question does not appear. This prevents you accidentally deleting valuable recordings. If you want to delete the corresponding Audio Files from the hard disk, you can do so by choosing **File > Delete File(s)** in the Audio window.

Copying Audio Sequences

Creating New Regions

You make copies of audio sequences in exactly the same way you do MIDI sequences — by dragging them while holding down the ⌨ key. This automatically creates a new region in the Audio window. The new region will retain the same name as the old one, but will be numbered sequentially.

This allows you to alter the start and end-points of the copy independently of the original. It is comparable to a genuine copy of a Midi sequence, which is created in the same way.

Using an existing Region more than once (Alias)

Alternatively you can create another audio sequence from **the same region** in the Arrange window. To do this hold down the ⌥ and ⌘ keys as you are copying.

Now whenever you adjust the start or end-points of any one of these audio sequences, all the other audio sequences which were created from the same region will be adjusted as well. This is comparable to an alias of a Midi sequence, which is created in the same way.

Making Multiple Copies of Audio Sequences

By choosing **Functions > Repeat Objects** you can make multiple copies of both audio and MIDI sequences. A dialog box will appear so you can specify how many copies you would like; simply enter the desired figure into the field *Number of copies*. The copies are placed next to the original.

This always creates audio sequence aliases of the same region.

Close the box by hitting ⏎. The copies should now be visible.

This function can be called up from the Edit menu in all the Editors, or you can use the global key command *Repeat Objects*.

For more details about this function -- without any references to LOGIC Audio – see the Midi section of the manual.

Alternatively you can use the *Loop* parameter in the Audio Sequence parameter box (see section *Loop,* on page 4 - 6). Don't forget that these loops are based on the sample grid of the region. This means that even if the song tempo matches precisely, after a while the loop repeats will start to go "out".

Moving Audio Sequences

You can grab audio sequences in the Arrange window with the mouse and move them around just like MIDI sequences. Movements are made in steps of one bar denominator (e.g. quarters — see below).

If you hold down ⌃ while moving sequences, you can move them in steps of one division (in sixteenths, for example).

If you hold down ⌃and ⇧ while moving sequences, you can move them in tick steps (maximum resolution).

Alternatively you can use the Delay parameter in the Audio Sequence parameter box (see section *Delay,* on page 4 - 6).
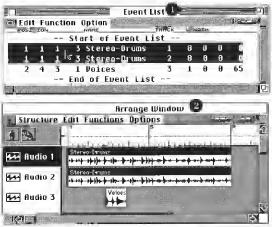
Fine-tuning

In practice, a resolution of "1 tick" will usually be fine enough.

To move an audio sequence by a finer resolution than ticks, i.e. by a resolution of 1 sample word, please use the anchor in the Audio window or Sample Edit window.

Don't forget that all audio sequences based on the same region will be fine tuned as well.

Moving sequences in the Event List

If you want to move sequences numerically, use the Event List. Select the audio sequence you wish to edit and choose **Windows > Open Event List** or press ⌘②. You can then move sequences by units of down to a single tick if you wish, by changing the value in the *Position* column.

Audio files in the Arrange window ❷ can also be displayed alphanumerically in the Event List ❶. Really accurate moves can be carried out easily using the Event List.

... to SMPTE Positions

Please note that the position of audio sequences can also be displayed in the Event List as a SMPTE value. To achieve this, select **Options > Positions in Frames/Bars** whilst in the Event List.

Tip If you're sync'ing music to picture, you can type in the required SMPTE positions for particular events. A simpler and more convenient method in the Event List is the keyboard command called *Pickup Clock*. This automatically places the anchor of the selected audio sequence at the

current song position (i.e. the point in the film you're locked up to when in Sync mode).

You can also display the end point of an audio sequence as a SMPTE time. To do this, choose "Length as Position" from the Options menu in the Event List.

Moving sequences back to the record position

You can move any audio sequence selected in the Arrange window back to the time position at which the region was originally recorded by choosing **Functions > Region(s) to Original Record Position**.

Inserting at the record position

Alternatively, you can copy (⌘C) or cut (⌘X) an audio sequence into the Clipboard, and then use **Edit > Paste at Original Position** to insert it into the selected track at the position it was originally recorded.

Changing Start and End Points

You can shorten or lengthen any audio sequence by grabbing it on its lower right hand corner with the mouse and dragging it, although naturally, you cannot make an audio sequence longer than its original audio file. Any adjustment you make to the length of the audio sequence also affects the corresponding audio region. This in turn means that all the *other* audio sequences derived from that region will be lengthened by the same amount.

Of course, the same goes for any changes you make to the start point of an audio sequence (or region, for that matter). Such a change can be made by made by grabbing and pulling the lower left edge of the sequence with the mouse.

You can edit start and end points much more accurately with the Sample Editor, which can be opened by double-clicking on the audio sequence. Here, you can edit the original region corresponding to your selection by grabbing and dragging the start and end points while holding down the ⌧ key. The changes you make to the region's start and end points are then made permanent by selecting **Edit > Selection to Region**.

Note

Adjusting the Grid to Zero Crossings

If **Edit > Search Zero Crossings** is switched on in the Audio window, every time you alter the start or end of a region in the Arrange window

this will be adjusted to the nearest zero crossing of the waveform. The Anchor is not affected.

The disadvantage of this option is that after you have altered the start or end points they will never be exactly on the chosen musical grid, but will always be a few ticks out. Normally this will not matter, because the Anchor reference point is not affected. However, if this causes problems in special situations, you can switch off the *Search Zero Crossings* option.

Audio Sequence Parameter Box

Name

Just as with MIDI sequences, the top line of the sequence parameter box is for giving a name to the sequence. You can name several selected audio sequences at once; the sequences are then given the same name and distinguished only by different numbers at the end of the name, which LOGIC Audio adds in automatically unless you deliberately leave a space at the end of the name.

When you change the title of an audio sequence, the corresponding region is also renamed in the Audio window.

Loop

As with MIDI sequences, you use the loop parameter to set an audio sequence to loop automatically. The loop cycles until it reaches the next audio sequence on that track, the end of the song, or the end of the folder.

Delay

Just as with MIDI sequences, you can advance or retard the playback of audio sequences, and once again the smallest available units are Ticks.
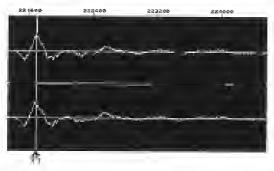
The Audio Sequence Anchor

The anchor is an audio sequence's temporal reference point. When you move an audio sequence, it's not the start point that is displayed in the Info column, as with MIDI sequences — it's the anchor point.
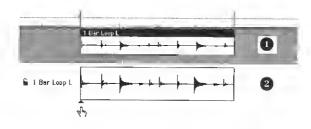
To guarantee perfect sync between (for example) a one-bar drum loop and your sequencer, the anchor must be assigned to a well-defined musical point. If the loop begins with a significant level peak (say a kick
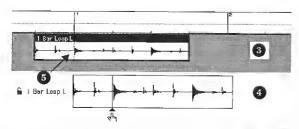
drum beat), set the anchor to the point where the volume of that beat is at its precise peak.

The following procedure can be useful in determining whether the anchor is set to its optimum position or not: play a drum sequence in via MIDI that duplicates the main rhythmic stresses of the drum loop. You should then be able to correct the anchor position by ear.

The changes made to the position of the anchor in the Audio window (❷ and ❹) directly affect the audio sequence in the Arrange window (❶ and ❸). The position of the audio shifts relative to the sequencer's time axis, while the anchor remains tied to the same bar value, and is marked by a dotted line ❺.

MIDI- and Audio Sequences compared

The following table sums up the main differences between audio and MIDI sequences as far as their purpose and uses are concerned. There are some notes at the bottom of the table to clarify the most important points.

Characteristic	MIDI sequences	
		Audio sequences
Composed of discrete data	Yes	No, because audio sequences are just alias objects for Regions, which in turn merely refer to Audio Files
Can be given names	Yes	Yes
Sequence parameter "Loop" available	Yes	Yes
Sequence parameter "Quantize" available	Yes	No, but the position of audio sequences themselves can be quantized, using the Event List display on the Arrange level
Sequence parameter "Transpose" available	Yes	No
Sequence parameter "Velocity" available	Yes	No
Sequence parameter "Dynamics" available	Yes	No
Sequence parameter "Gate Time" available	Yes	No

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Characteristic	MIDI sequences	
		Audio sequences
Sequence parameter "Delay" available	Yes	Yes
Freely positionable	Yes	Yes
Left or Right Corner Edit	Yes	Yes, and this affects the audio region, but not the position of the audio signals relative to the time axis of the sequencer
Can be cut with the scissor tool	Yes	Yes, creates new regions
Can have alias objects made from them	Yes	Yes, audio sequences are already alias objects
Concealable intro	No	Yes
Have a variable musical reference point	No	Yes, a variable Anchor. This affects all the audio sequences derived from one region and can change the position of the audio signals relative to the time axis of the sequencer
Can be turned off with the Mute function	Yes	Yes
Can be grouped into folders	Yes	Yes
Can be solo'ed	Yes	Yes

Naturally, some of the parameters that can be applied to MIDI events have no effect on audio signals.

Only audio sequences have globally variable regions and the flexible reference point provided by the Anchor.
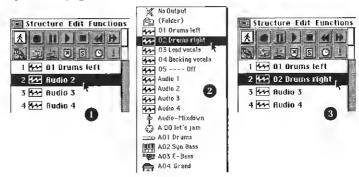
The fundamental functions (such as the freely determinable position and length, the ability to create complex arrangements with the aid of

folders, and the ability to name, mute, and solo) are generally available to all types of object (MIDI sequences, audio sequences, folders and Alias objects).

4.2   Recording

Creating Audio Tracks

You select an audio object as a track instrument by clicking on a track name in the Arrange window while holding down the mouse button. This opens the Instrument flip menu, where you select your audio object. To help things along, audio objects "Audio 1" to "Audio X" are preset for all tracks of the HDR hardware, but you can of course add to these. For more information on this subject, read the section *Audio Objects,* on page 3 - 2.

Selecting an audio object in the Arrange window: ❶ Click on a track... and ❷ select the desired audio object from the Flip menu. This then appears in the track ❸.

Tip   If you still want to make adjustments to the audio objects, you can do it directly from the Arrange window. The Instrument Parameter box is situated under the toolbox there.

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4

"Arming" Tracks

Method 1:

- Open the Environment Layer containing your audio objects, (for example from the Audio window by selecting **Options > Audio Record**).
- Click on the REC button of all the audio objects whose tracks you wish to record on.

Method 2:

- ⌘⇧–click the audio objects directly from the track column of the Arrange window.

Click the audio object once more (as shown above) to disarm the track again.

You can only make audio recordings on tracks that have been armed, no matter what track the cursor is on in the Arrange window.

- If you choose a MIDI track, you'll record MIDI events.

- If you choose an audio track, you'll record on all the tracks that have been armed (record enabled).

- You can record simultaneously on one MIDI track and several audio tracks together by clicking the MIDI track and the audio tracks you're going to record on while holding down the ⌘⇧ key.

If several Arrange window tracks are assigned to the same audio instrument (e.g. "Audio 1"), then the new audio file (or region) will be assigned to the selected track.

"Disarming" all tracks

If several tracks are record-enabled, you can instantly disable them all at once by clicking one of the flashing REC buttons while holding down the ⌫ key.

Recording Modes

LOGIC Audio gives you various options for starting audio recordings at certain points in your Song(s).

Standard Recording with Count-In

You can start recording at any point you like in a song by setting the Song Position Line to the required place. If the audio tracks you want to record on are correctly set, and the necessary input signals are con-

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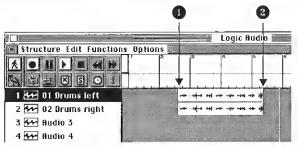nected and properly adjusted, just hit the record switch on the Transport bar, or press ⌕.

A 'count-in' will sound. Signals will be recorded during this time (so no swearing, folks!). Depending on the number of tracks required, LOGIC Audio will pause for a short time between the record button being pressed and the recording actually starting.

If you need to make a recording quickly, select the option **Preferences > Audio >** *Quick Record without prepare of Play Tracks*. This ensures the accuracy of your punch in and outs but may cause the playback tracks to be temporarily muted at the beginning of the recording.

LOGIC Audio will then automatically create an audio sequence for what you've just recorded. You can monitor the volume level in the Arrange window as it plays back in real time.

Manual Drop Record

But there's more. You can actually engage recording mode in the midst of playback — "on the fly", as it were. To do this, start playback and press ⊟ (preset for *Record Toggle*) at the point where you want to start recording. Audio recording starts immediately, and can be stopped at any time (as well as by pressing STOP in the usual way) by pressing ⊟ again. If you use this second option, recording ceases, but the sequencer will continue playback.
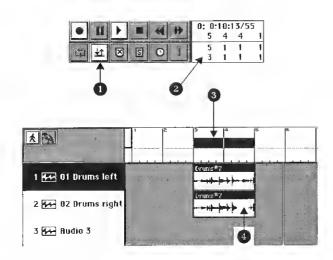

A recording made during playback, by hitting ⊟ twice (at the points shown by ❶ and ❷).

Pre-programmed Drop-Record

LOGIC Audio's autodrop function can be used on audio tracks just as it can with MIDI sequences. You enable this mode by clicking on the autodrop switch on the Transport bar. Here is a step by step breakdown of the procedure:

❶   The autodrop switch must be turned on.

❷   You can set the autodrop locators numerically in the Transport window.

❸   The autodrop recording zone is marked out by a thick black stripe in the middle third of the bar ruler.

❹   Recording only takes place within the autodrop zone you have set up, with the exception of a short 'lead-in' just before recording is due to start (see below).

The autodrop zone start and end points can be set either from the bar ruler or by using the locators in the Transport bar. Please note that if the Cycle function is switched on you can set the Autodrop Locators in the Transport window just to the right of the Cycle Locators.

Start the recording. LOGIC Audio will begin recording about one bar before the drop-in locator; but afterwards, an audio sequence will be created that is the exact length of the autodrop zone. This method has the advantage that the start of the audio sequence can then be lengthened later if desired, so that the lead-in time becomes audible. However, doing this does not change the position of the recording relative to the time axis.

A small tip: if you wish, you can even define a small autodrop zone within a larger passage set up in Cycle Mode (see below). This can be handy, for example if a player needs to re-record a difficult passage in the middle of a song, and requires many attempts to get it right.

Recording in Cycle Mode

Audio recordings are also possible in Cycle mode. However, for technical reasons, you cannot store several attempts at an audio recording, as you can with MIDI events. Audio recording automatically stops at the end of the cycle, and the recording is then played back as soon as possible. So, you can record an audio track in one pass and then hear it *in situ* the very next time around, without having to stop the sequencer.

After recording, please take note...

After you've made your audio recording, you should not make any further adjustments to the tempo of your Song(s). Decide on a tempo and all the changes in tempo well before the first audio recording, and stick to it! Audio recordings have a fixed playback time and can only be matched to new tempos if you're prepared to go through a great deal of hassle. The time compression/expansion algorithms currently available only permit you to match audio to new tempos when the tempo differences involved are small; if you try and use them to significantly change the tempo of your audio recording, its quality will be significantly compromised.

Note   If you've made your audio recordings in real time, playing them in over the top of, say, an existing MIDI arrangement, we don't particularly recommend that you move the anchor of any of your regions very often either. You can make slight adjustments to the timing of your audio sequences using the "Delay" object parameter.

4.3   Functions

Automatic Tempo Matching

Amongst all its other amazing features, LOGIC Audio even has an automatic function for matching the length of a passage of free-form music with the length of an audio region. The length of the region remains constant here, but the sequencer tempo is varied automatically so that the region and the musical passage end up exactly the same length.

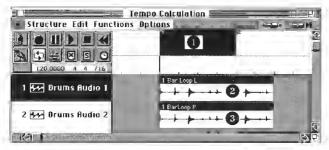We can show how to make use of this function if we take a one-bar drumloop as an example:

Imagine you've recorded a drumloop live or from a sampling CD. Using the Audio window and the sample editor, you've adjusted the start and end points of the audio region so that the loop cycles perfectly without any glitching.

Now you take the drum loop region into the Arrange window, where it appears as an audio sequence. Make sure that you place the beginning of the audio sequence at the start of a bar.
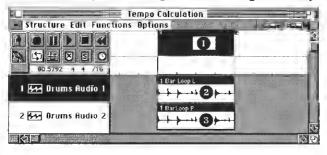
Construct a cycle in the Arrange window bar ruler whose length matches the *intended* musical length of the audio sequence. The drumloop is one bar long, so you should pick a cycle length of one bar to match.

In the bar ruler you can match the desired musical length ❶ (that of the cycle) to the actual lengths of the audio sequences ❷ and ❸ ...

Choose **Functions > Adjust Tempo using Object Length & Locators.**

Note that the tempo has matched itself in such a way that the audio sequence is now exactly one bar long, and fits the length of the cycle.

Audio and MIDI Scrubbing

You can scrub through audio and MIDI in the arrange window simultaneously; however, note that scrubbing through audio recordings is currently only available to those with DAE hardware!

Please note that due to restrictions in the most recent version of the DAE (v1.4), scrubbing is only possible with one stereo or two mono tracks. Future versions of DAE will not be subject to these restrictions.

If your Song contains audio sequences running on more than two neighbouring tracks (e.g. on 1-2-3 & 4), select just (say) the ones on tracks 2 and 4, so that you can scrub through them.

Before scrubbing can be carried out you have to switch on **File > Song Settings > Midi Options >** *Scrubbing with Audio in Arrange*.

Let's get Scrubbing!

Hit the PAUSE button on the Transport window.

Grab the Song Position Line with the mouse and move it back and forth through the parts of the Song you want to hear played back fast. Note how audio and MIDI data are played back in perfect sync when scrubbing.

You can scrub at any zoom resolution – so set up a magnification that you're comfortable with for the section of the song you're scrubbing through.

If your HDR hardware permits, scrubbing can also be activated when you are cutting audio sequences with the scissors in the Arrange window.

Digital Mixdown

Using LOGIC Audio, you can mix down audio data in the digital domain from within the Arrange window. This is done with the glue tool. This function is non-destructive, as LOGIC Audio always creates a new file for the mixed-down material. This new audio file is stored on your hard drive, so you should keep an eye on available space you have left.

To carry out a mixdown, you choose the glue tool from the toolbox and use it to select the required audio sequences for mixdown (if necessary using the ⌥ key as well).

Note   The mixdown process can be aborted with ⌘⠤ (command–period). All audio files will remain unchanged.

No Mixdown Situation

If there are several audio sequences (mono or stereo) in a row on the same track, which have been cut out of one region using the scissors tool, i.e. which originate in this order from the same audio file, no mixdown is carried out. Instead, a single region is simply created over the entire area!

LOGIC Audio can recognize associated regions even if there are gaps between the regions. The determining factor is that the relative position of the audio sequences in the Arrangement corresponds to the relative position of the regions in the audio file.

"Mixdown" of Audio Sequences in a Track

If several audio sequences that run concurrently (i.e. not after one another) are selected from one track, the program does not mix them down. Instead, you are asked to create a new audio file, which is named after the first region. The selected audio sequences are then mixed together without any changes to volume, and without clip scanning.

If there are empty sections between two audio sequences, these are added into the new audio file as silent passages.

Genuine Mixdown with Clipscan

If you combine audio data from two or several tracks, the current values for pan and volume found in the Environment for the individual tracks are the ones that decide the pan and volume settings in the new audio files. If you combine both sides of a stereo audio file, first set the pan controls of the component mono sides to hard left and hard right respectively.

You can carry out a mixdown while a song is in playback.

After the digital Clipping scan is over and the Mixdown is complete, LOGIC Audio replaces the previously selected audio sequences with one audio sequence which contains the new, mixed-down audio file in it's entirety. If you wish, you can use the undo function to restore the original audio regions. If you do this, you will then be asked if you wish to keep the newly created combined audio file or delete it. If you decide to keep it, it will remain in the audio window, and can be further processed there.

When mixing down, LOGIC Audio automatically uses internal 32-bit technology to achieve the highest possible level without overloading or loss of resolution.
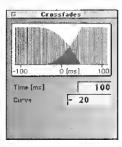
Audio Crossfades

The Digital Mixdown function (glue tube, menu or key command) in the Arrange window supports audio crossfades. This function is not hardware-dependent, since the result is the creation of a separate audio file. Audio crossfades will therefore work with DAE, CBX or in AV-mode.

The parameters are defined in the *Audio Crossfades* dialog window, which can be opened either via a key command or by choosing: **Structure > Merge > Audio Crossfade Options**.

The key command for opening the dialog window can also be used to close it.

The parameters apply globally and are stored in the Preferences file.

There are two parameters:

Time [ms]:   This is the temporal length of the whole crossfade. To switch off the crossfade, set this value to nil.

Curve: To obtain a linear crossfade, set this value to nil. Other values (positive or negative) produce various exponential fades. The fade-outs and fade-ins are always symmetrical, to avoid deviations in level.

The preset values are: *Time = 20ms, Curve = 0* (linear).

The graph shows the actual shape of the crossfade, because the original algorithms are also used to calculate the curve display. Values over about 250 ms are scaled in the graph, to ensure that the whole crossfade is visible.

Chapter 5
The Audio Window

LOGIC Audio allows you to access all digitally stored audio recordings (audio files) stored in the most common Macintosh formats: AIFF (Audio Interchange File Format) and SD II (Sound Designer II format). All recordings made using LOGIC Audio are stored in the Sound Designer II format.

5

The Audio window of a LOGIC Audio song is where you organize all the relevant audio files on the hard disk. It doesn't matter whether these audio files have just been recorded or whether they were copied weeks ago from a CD-ROM onto the hard disk. The Audio window gives a LOGIC Audio song access to any compatible data on the hard disk.

There is no timing assignment of the recordings in the Audio window. An audio file contains no information on its time position in relation to the musical sequencer's time axis. This assignment is made by arranging sections of the audio files, known as regions, in the Arrange window in the same way as MIDI sequences.

The Audio window is really like a catalog for audio files. It also gives you an overview of what regions have been defined in an audio file.

Here you can define new regions and edit, delete or rename existing ones. When you edit them the accuracy is limited to units of 256 sample words. To make more precise edits use the Sample Edit window.
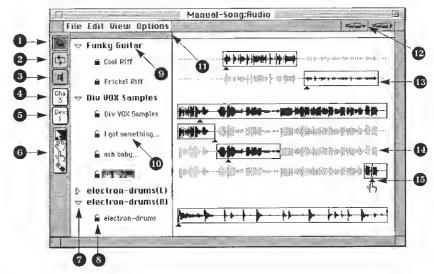
These regions can then be dragged from here into the Arrange window where they can now be arranged as audio sequences.

The menus in the Audio window contain all the operations relating to the administration of audio files and regions plus the System parameters of the hard disk recording hardware (HDR hardware).

Opening the Audio Window

To open the Audio window choose **Windows > Open Audio** (or ⌘⟨9⟩). You can open several Audio windows at once (even within one Screenset) for example, if you want to use different zoom factors.

- ❶ Link button
- ❷ Region cycle button
- ❸ Monitor button
- ❹ Selection field for the output channel for monitoring
- ❺ Selection field for the output hardware for monitoring (only visible if more than one HDR hardware is installed!)
- ❻ Tool box for the Audio window
- ❼ Click this small triangle to show or hide the regions in the relevant audio file
- ❽ Click the lock symbol to protect the parameters of the region
- ❾ The name of an audio file (large print)
- ❿ The name of a region (small print)
- ⓫ Grab and drag this point to adjust the horizontal window division
- ⓬ Zoom telescope for adjusting the waveform display
- ⓭ Region box with waveform display
- ⓮ Display of the audio passages outside the current region
- ⓯ The anchor, the musical reference point in the region

If you add an audio file to the Audio window LOGIC Audio automatical-ly creates a region covering the whole length of the audio file.

EMAGIC

You can create as many regions as you want from the same audio file and there are also no limits in terms of length.

Regions can be moved with the mouse into the Arrange window. The audio file is then played at the desired song position.

5.1   Layout

On the left side of the window is a thin column. At the top this contains the mode buttons and at the bottom the usual tools, which are described in the following sections.

The column to the right lists the audio files and their regions by name.

Further to the right the regions are displayed as waveform graphics in the largest part of the window. A region is shown as a boxed, black (or color if used) area, while the rest of the audio file is shown in light gray indicating that this part of the audio file is not used for this region.

Zoom Functions

The two telescope symbols in the top right just below the title bar can be used to enlarge or reduce the display (zoom function).

You can use the telescope symbol on the left to enlarge or reduce the vertical display area to alter the amplitude of the region waveform display. (Preset key commands: ⌘⌥↑ and ⌘⌥↓).

The telescope symbol on the right is for enlarging or reducing the horizontal display area, i.e. altering the time display of the regions (⌘⌥→ and ⌘⌥←).

If you hold down ⌘ as you click the telescope symbols with the mouse you can alter the vertical and horizontal zoom simultaneously.

The Mode Buttons

The mode buttons allow you to select different operating modes. These affect both the display and the playback of regions in the Audio window.

Link

Link mode in the Audio window means that whenever you select an audio sequence in the Arrange window the relevant region is automatically moved to the visible area in the Audio window.

You can switch link mode on or off by clicking the button with the chain link icon.

»Hidden regions« cannot be displayed in link mode. If you want to display them you have to show the regions (see section *Hiding and Showing Region(s)* on page 5 - 5).

Monitoring

You can play regions directly in the audio window. This monitoring is not related to the time axis of the sequencer. There are several ways of playing a region:

Playing from a specific position

Click the desired region in the waveform display and keep the mouse button held down. Playback starts at the point where you clicked with the mouse. This allows you to play specific sections.

Playback stops as soon as you release the mouse button.

Playing the whole region

If you want to play an entire region select it by clicking the name of the region in the audio list. Now click the button with the speaker symbol to start playback. Click the button again to stop playback.

As well as using the mouse you can also start or stop this type of playback using the »Play/Stop Region« key command.

Stereo playback

If a region of a stereo file is selected, clicking the speaker icon plays both sides of the stereo file. However, if you click the switch while holding down command or shift only the selected region (mono) is played. If you then select a region of another stereo file, LOGIC Audio goes back to playing in stereo.

Region Cycle

Regions may be repeated in a continuous loop during monitoring. To switch region cycle on or off click the button with the circular arrow symbols. This mode applies to all regions of an Audio window.

This cycling only affects the monitoring in the Audio window and has
no effect on the actual sequencer functions. It should not be confused
with the cycle function (in the Arrange window).

You can adjust the start and end points of the region in real time while
the region is being continuously repeated. This is useful for setting pre-
cise region lengths, for example when "polishing" drum loops.

Choosing the Audio Output for Monitoring

The actual routing of the audio signals to the different outputs is done
in the Arrange window (using the audio object in the track list).

However, you can choose a specific channel of the HDR hardware for
monitoring in the audio window. Set the desired output in the *Cha* but-
ton below the speaker symbol.

In the *Dev* button below it you can choose between the different audio
hardware systems if you have installed more than one. If you don't have
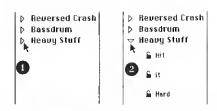more than one this button will not appear.

5.2   Display

The Audio List

The list display of the audio files and regions (known as the audio list)
gives an overview of all the audio files used in the current song and the
regions contained within them. This is where audio files can be added,
removed, deleted or renamed. Regions can also be created, deleted
and renamed.

Hiding and Showing Region(s)

After you add an audio file you can see the file name in the Audio win-
dow in large print. This does not take up much space on the screen and
gives you the maximum overview of all currently loaded files. There is
a small triangular arrow directly next to the file name ●.

```
▷ Reversed Crash      ▷ Reversed Crash
▷ Bassdrum            ▷ Bassdrum
▷ Heavy Stuff         ▽ Heavy Stuff
   ▶                     ▶
  ❶                    ❷  🔒 Hit

                         🔒 it

                         🔒 Hard
```

Click the small triangle ❶ next to an audio file to reveal the regions. Like the list display of folders in the Macintosh file system this shows you the »contents« of the audio files – i.e. the relevant regions. The arrow is now pointing downwards towards the regions which are shown in small print. Click the triangle again to hide the regions.

You can also press the Command key while clicking on this triangle to quickly Hide/Show ALL regions.

Activating the Display of all Regions

By choosing **View > Show All Regions** you can instantly display all regions from all audio files registered in the Audio window.
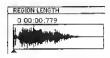
Hiding the Display of all Regions

By choosing **View > Hide all Regions** you can instantly remove the display of the regions in all the audio files.

If you want to view individual regions just click the small triangle to the left of the file name.

Displaying the Lengths of the Regions

The lengths of the regions can be displayed in various units.

```
┌─ REGION LENGTH ──────────┐
│  0 00:00:779              │
│  ▄▄▄▄▄▄▄                  │
│ ▐▓▓▓▓▓▓▓▄▄               │
│  ▀▀▀▀▀▀▀                  │
└──────────────────────────┘
```

Choose **View > Show Length as...** . On the lowest level of this hierarchical menu you can choose the units for the display of the lengths of all regions.

... None

No display of the lengths.

... Min:Sec:Ms

Absolute time length of the region in hours, minutes, seconds and milliseconds. The region in the diagram is 779 ms long.

... Samples
Number of sample words in the region.

... SMPTE Time
SMPTE length, which unlike absolute time gives frames and bits instead of milliseconds.

... Bars/Beats...
Display of the region in musical units: bars:beats:divisions:ticks.

If the tempo, time signature or »divisions« settings are altered the display is automatically recalculated.

Displaying Information about the Audio Files
Information on every currently loaded audio file can be displayed from left to right in the region waveform display as follows:

Sample rate (Hz), file size (kByte) and file path or directory.

You can switch this option on or off by choosing **View > Show File Info.**

	SRATE	SIZE	LOCATION
▽ **FX Robot Arm**	44100	67K	AUDIO1 :... :Samples :

Sorting Audio Files
The audio files in the Audio list can be sorted according to various criteria by choosing **View > Files sorted by...:**

... None
The audio files are listed in the order in which they were loaded or recorded.

... Name
The audio files are listed in alphabetical order.

... Size
The audio files are listed according to size in decreasing order.

... Drive
The audio files are sorted according to the drive where they are stored (hard disk, removable drive, partition).

Sorting Regions
The display of the regions can be sorted within an audio file according to various criteria by choosing **View > Sort Regions by...**

... Start

The regions are sorted according to their time position in the audio file. It is the default setting.

... Length

The regions are sorted according to their lengths.

... Name

The regions are sorted alphabetically.

The Waveform Display outside the Region

LOGIC Audio is preset so that the waveforms outside the defined region area are shown in light gray.

You can alter the display yourself by clicking inside the region while holding down 🔁 and keeping the mouse button held down. A flip menu appears containing the following options:

None

No waveform display outside the regions.

Bright
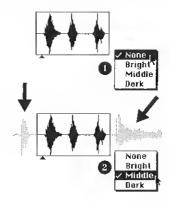
Waveform display outside the regions colored light gray.

Middle

Waveform display outside the regions colored gray.

Dark

Waveform display outside the regions colored dark gray.

Overview Calculation

In addition to the pure audio data, an audio file also contains data which is required for graphic display of the waveform in the Audio window and Sample Editor ("Overview" data).

Automatic Overview Calculation

If the option *Create Overviews after recording* is switched on in **File > Preferences > Audio** these data are automatically calculated straight after a recording.

If you switch off this option the overviews are not calculated automatically. However, you can start them manually.

Starting the Overview Calculation manually
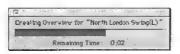
Sometimes when you load/import audio files, you have to carry out the calculation manually if the audio files don't contain any overview data.

You can start the overview calculation of selected files by choosing **File > Refresh Overviews**.

Controlling the Overview Calculation

The calculation of the overview data in an audio file is shown via a bar display in a float window. This calculation is carried on in the background so you can continue working with LOGIC Audio.

You can position this float window where you want – the last position is saved in the Preferences.

Double-clicking this window opens the following dialog box:

If you stop the calculation by clicking *Abort* you can still play the audio file – but bear in mind that without an overview it will not be easy to edit!

Continue carries on the overview calculation in the background as if nothing had happened.

Clicking *Finish* transfers the calculation to the foreground and therefore speeds it up considerably. The disadvantage is that you cannot use your computer for anything else until it is finished.

Logic AUDIO

5.3 Operation

Selection Techniques

There are several different ways of selecting audio files and regions in the Audio window.

To select a single item just click either the name in the audio list or the waveform display.

If you hold down ⬈ at the same time you can select several items, even if they are spread out. In the audio list you can also use »rubber band selection«.

To select all items at once choose **Edit > Select All** (⌘Ⓐ).

Audio Files

Selecting the next Audio File

The key command *Select Next Audio File* selects the next audio file in the audio list.

Selecting the Previous Audio File

The key command *Select Previous Audio File* selects the previous audio file in the audio list.

Audio Files and Regions

Selecting used Regions

When you choose **Edit > Select used** all audio files and regions used in the arrangement of this song are selected.

Selecting unused Regions

Choosing **Edit > Select unused** selects all those audio files and regions which are **not** used in the arrangement of the current song. For example, you can call up this function at the end of a production to delete any items that are not required (⌫).

Edit Commands

All the standard edit commands are available in the Audio window. As usual, they apply to the currently selected entries (whether audio files or regions).

The *Cut, Copy* and *Paste* commands only apply to exchanging items between two different songs. An audio file can only appear once in a song's audio list and so cannot be copied within a song. For instructions on how to physically copy an audio file on the hard disk please see section *Copying Audio Files* on page 5 - 33.

Cut (⌘X)

The selected audio files or regions are cut out, i.e. moved onto the clipboard. They are removed from the Audio window.

Copy (⌘C)

The selected audio files and their regions are copied onto the clipboard. They remain in the Audio window.

Paste (⌘V)

The contents of the clipboard are added (providing they contain audio files and their regions from another song).

Clear

Any selected audio files or regions are deleted. You can achieve the same effect by pressing ⌫.

Don't forget: the functions **Cut** or **Clear** do not delete audio files from the hard disk, they just remove them from the Audio window of this song.

If regions from the audio files in the Arrange window are being used as audio sequences these sequences will be deleted as well.

If you want to delete the selected audio files from the hard disk just choose **File > Delete File(s)**.

Undo – Reversing the Previous Command (⌘Z)

You should call up this function if you want to reverse an action.

Note   Not all actions can be reversed using *Undo*. If you call up a function which you cannot *Undo* you will be warned of this before you execute the function.

Regions

Creating a Region

Select the desired audio file and choose **File > Add Region**. The new region will be added after the existing regions.

Logic
A U D I O

Copying a Region

If you select an existing region before carrying out the *Add Region* function, another region is created whose definition (start, end, anchor) is exactly the same as the selected region.

Deleting a Region

You can use the eraser tool to delete one or more regions. If you have created audio sequences from this region these will automatically be deleted as well. You should therefore be careful when using this tool and remember the Undo function is always available, if necessary.

Alternatively you can delete any selected regions with the ⌫ key.

5

Altering the Limits of a Region

You can directly alter the limits of a region in the graphic display using the region edit tool.

Alternatively you can use the normal mouse pointer. Just make sure you grab the region **by the lower third when carrying out the following actions!**

Moving the Start Point

To move the start point of a region grab the left border. The tool turns into a small hand pointing to the right. You can now adjust the start point.

Moving the End point of a Region

To move the end point of a region grab the right border. The tool turns into a small hand pointing to the left. You can now adjust the end point.

Moving the whole Region

You can also move the whole region within an audio file by grabbing it in the middle. The tool turns into two arrows pointing left and right. If the region is very small use the zoom function to enlarge the section. Make sure you can see the two arrows before making any alterations.

If you want to move the limits of the region without moving the anchor hold down ⇧ during the operation. This applies to moving the start or end points as well as moving the whole region.

Note

Moving the Anchor

To move the anchor grab the small anchor triangle below the region. The tool turns into the region edit tool. A guiding line appears above the anchor triangle.

Note

With audio sequences in the Arrange window the anchor is marked by a vertical dashed line.

Moving to Zero Crossings

If **Edit > Search Zero Crossings** is switched on whenever the start or end point of a region is moved the nearest zero crossing is searched for to ensure »glitch-free« playback. With the start point the area before the chosen start point is searched and with the end point the area after it. This option is useful when defining regions in the Audio window.

Note

Please note that *Search Zero Crossings* also applies to all operations in the Arrange window!

Fine Movement

The graphic display in the Audio window is optimized for quick and simple organization of the audio files and regions. This involves displaying as many things as possible simultaneously in a window. The finest resolution for positioning the start point, end point and anchor is therefore limited to units of 256 samples. This is usually sufficient, particularly if search zero crossings is switched on.

However, sometimes you need to make precise adjustments down to the individual sample words. Drum loops are a good example. The Sample Edit window is better suited to these situations. To open the Sample Edit window for a region double-click the region.

Protecting the Region Parameters

Regions can be protected against accidentally altering the start and end points and the anchor. The small lock symbol next to every region can be opened and closed by clicking it. If it is locked you can play the region but you cannot edit it.

▽ **Audio File**

🔒 locked Region

🔓 unlocked Region

Important

This function should not be confused with the delete protection for files in the Finder. A protected region can still be deleted!

Renaming Audio Files and Regions

To rename audio files and regions in the Audio window just double-click the name in the audio list. A text input box appears where you can type in a new name.

Before renaming audio files the following warning appears:

Keep in mind other songs may use the same file!
Do you still want to rename the file?

You should check whether the audio file that you want to rename is used by another song. If it is don't rename the file otherwise it will not be found or played by the other song.

LOGIC Audio helps you in these situations:

*   LOGIC Audio alters the name of an audio file in all currently opened songs which use this file.

*   LOGIC Audio automatically assigns the new name to any SDII stereo file which is connected to the renamed file and is stored on the same storage location on the same drive (and has the same name).

*   LOGIC Audio also renames any backup files on the same drive.

If you rename a stereo file LOGIC Audio automatically assigns the new name to up to five files (both the mono files used in LOGIC Audio, their backups and the stereo file). In this case it is a good idea to store all these files in the same location. (Refer to the section on moving files.)

You can rename regions whenever you like.

Providing the regions have the same names as their audio files – in this case you don't need to rename any of the regions – any renaming of the audio files is automatically carried over to their regions. **Note**
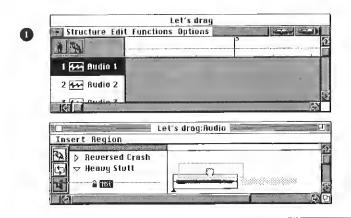
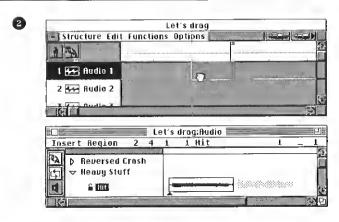## Adding a Region to the Arrangement as an Audio Sequence

To add a region to the song arrangement drag its graphic display into an open Arrange window to create an audio sequence.
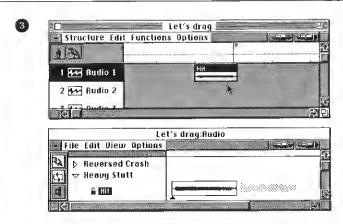
Grab the middle of the graphic display of the region in the Audio window and drag it into the Arrange window.

Don't worry if the region is sometimes »played« (monitoring a region). It will stop playing as soon as you move the mouse pointer outside the Audio window . You can prevent this monitoring by using the region drag tool (the small hand with the outstretched fingers) or by grabbing the name of the region in the Audio List and dragging it into the Arrangement.

1

Let's drag
Structure Edit Functions Options
1 Audio 1
2 Audio 2

Let's drag:Audio
Insert Region
▷ Reversed Crash
▽ Heavy Stuff
Hit

2

Let's drag
Structure Edit Functions Options
1 Audio 1
2 Audio 2

Let's drag:Audio
Insert Region 2 4 1 1 Hit 1 1
▷ Reversed Crash
▽ Heavy Stuff
Hit

3

Let's drag
Structure Edit Functions Options
1 Audio 1
2 Audio 2

Hit

Let's drag:Audio
File Edit View Options
▷ Reversed Crash
▽ Heavy Stuff
Hit

5.4   Strip Silence

Strip Silence: Automatically Creating Regions

The *Strip Silence* function allows you to create regions automatically. The basis used to create the regions is the composition of the audio - material itself, i.e. the succession of loud and soft passages and gaps.

Functional Principle
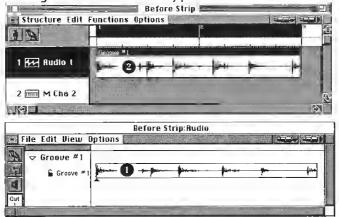
The principle is simple: all the amplitude values below a set threshold are interpreted as »silence« and removed. New regions are created from the remaining passages whose level is above the threshold.

You can choose to replace the original region in the Arrange with these new regions without altering the timing of any of the passages.
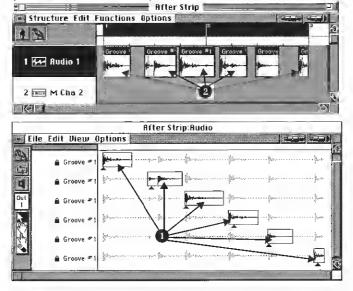
The main uses are as follows:

*   Removing background noise during gaps (noise gate).Unlike ana-logue noise gates strip silence works "in advance". There are no problems with cut-off attack phases.

*   Dividing a long section into several convenient segments (e.g. for deleting or sorting).

*   For short percussive regions (e.g. drumloops) you can achieve a »quasi time compression/expansion« simply by altering the tem-po.

5

You can even quantize the individual segments in an audio recording -
something which until now was only possible for MIDI events. The *Strip*

Silence function can automatically cut up a region ❶ or its audio
sequence ❷ based on the amplitude structure.

• A long region segment is cut into smaller sections ❶ which are
then available as separate audio sequences ❷ in the Arrange win-
dow.
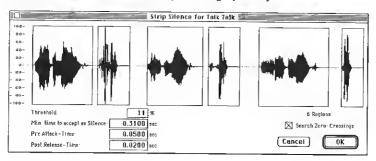
Calling up the Strip Silence Function

First select the region in the Audio window on which *Strip Silence* is to
be carried out. If you are using stereo audio files the corresponding re-
gion of the other channel is automatically selected too. Then choose
Options > Strip Silence in the Audio window . The Strip Silence win-
dow opens.

The Strip Silence Window

There are several settings in the Strip Silence window which directly af-
fect the number and length of the newly created regions.

The top part of the window shows a graphic prediction of the result.
This gives you an immediate visual overview because any changes in
the parameters are immediately shown graphically.

5

Strip Silence Parameters
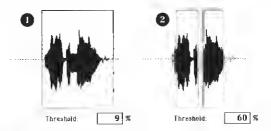
Depending on the audio material all the parameters can have an effect
on the number and division of the regions. To get the desired result you
may have to experiment a little first.

Threshold

The *Threshold* defines the amplitude threshold that a passage has to
exceed in order to be defined as a region.

The units here are shown in percentages.

In terms of the number and length of the regions this is the most important parameter. As a general rule: a higher Threshold leads to more short regions.
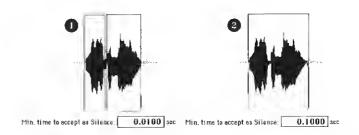

Example of »Threshold«: low values ❶ create large, connected regions, high values ❷ cause more sub-division into several regions

Min. time to accept as Silence

You use *Min. time to accept as Silence* to define how long a passage must be below the threshold value before it is considered to be a gap.

The units here are shown in seconds. The smallest division is one tenth of a millisecond.

Very small values tend to increase the number of regions, because even short dips in amplitude are interpreted as silence. Higher values prevent audio passages from being »interrupted« by fluctuating amplitudes.

Example of »Min. time to accept as Silence«: with low values ❶ even short dips in amplitude are excluded, with higher values only longer stretches of lower amplitude are removed.
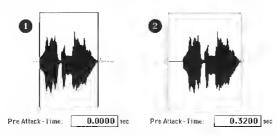
Pre Attack-Time

The *Pre Attack-Time* parameter allows you to define an automatic pre-delay in the start times of all the regions created. With high threshold values this prevents any amplitudes with slower attack times from be-

ing »chopped«. This function is useful for non-percussive signals like vocals, wind instruments, strings, etc.

The units here are shown in seconds. The smallest division is one tenth of a millisecond.

Example of »Pre Attack Time«: values higher than »0« pre-delay the start point.

Overlaps are permitted, i.e. the pre-delayed start point of a region can be in end of the previous region – but only as long as the threshold value is not exceeded.
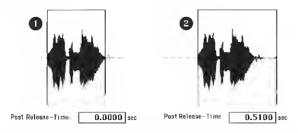
Altering the *Pre Attack Time* has no effect on the anchor position or the absolute position of the audio data on the sequencer time axis.

Tip

Post Release-Time

Next to *Post Release-Time* you can define an automatic release time for the end points of all the regions.

The units here are shown in seconds. The smallest division is one tenth of a millisecond.

Example of »Post Release«: values greater than »0« lengthen all the affected regions

You can use this function to avoid cutting off amplitudes which fade out gradually (particularly if you have set a high threshold value). For example, cymbals, open hi hats, snares with long reverbs, vocals, etc.
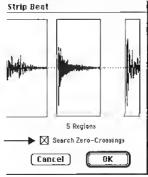
The *Post Release Time* parameter does not allow overlaps. This means that the region's end point cannot extend beyond the start of the next region.

Tip   Adjusting the *Post Release Time* does not affect the anchor position or the absolute position of the audio data on the sequencer time axis.

Search Zero Crossings

If the *Search Zero-Crossings* option in the Strip Silence window is active the region start and end points are always automatically set to the nearest waveform zero crossings.

Click the check box to switch the automatic positioning to waveform zero crossings on and off.

Replacing a Region in the Arrange

If you are editing a region which is being used as an audio sequence in the Arrange window, you can make the following dialog window appear if you click OK in the Strip Silence window (or press ⏎):

If you want to replace the region in the Arrange window with the regions created by the Strip Silence function, please click *Replace* or press ⏎. This means that the relative timing of the individual audio fragments remains unaltered. You can listen to the result and if you are not satisfied you can Undo it.
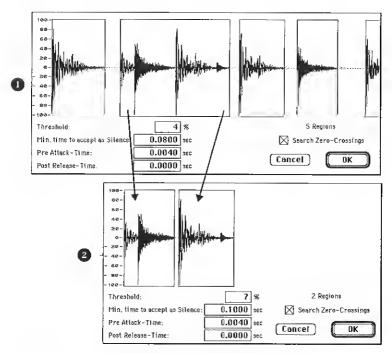
If you want the new regions to appear only in the Audio window please click *No*. You can then drag them individually into the Arrange window in the usual way.

Multiple Editing using Strip Silence

Strip Silence always affects the selected region in the Audio window. It doesn't matter if a region has been defined manually or whether it is a product of the *Strip Silence* function.

For example, you can use this method to roughly split up a whole audio file and then divide the new regions using different parameters.The new regions can then be subjected to the *Strip Silence* function yet again — and so on.

For example, you can use this function to split up drum tracks according to the composition of the audio material.

5

Example of the »Strip Silence« function in two stages: in the first stage ➊ a one bar drum loop is first split up into multiple sections, in the second stage ➋ this new region is divided yet again.

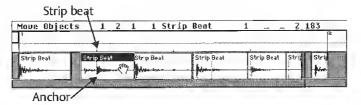### Reassigning Audio Sequences using Strip Silence

Regions which already exist as audio sequences in the Arrange window are also split up by the *Strip Silence* function. However, the position of the audio data on the sequencer time axis is not affected. This means that a recorded audio sequence can be immediately edited using *Strip Silence*. Several new audio sequences are then created which can be individually moved, copied or deleted.

Automatic Positioning of the Anchors

When you create new regions using *Strip Silence* a separate anchor is automatically created for every region. LOGIC Audio always sets this to musical units in accordance with the format value set in the Transport panel. This means that when you are moving audio sequences to fit in with the music there will be »rounded« values in the Info line.

Important   It is recommended that you adapt the tempo, particularly for drum loops, before carrying out the Strip Silence function (see section *Automatic Tempo Matching* on page 4 - 14). You should also set the desired format value if necessary before using *Strip Silence*.

The anchor is automatically set to musical units, in this case the »two« of the first bar. The info line displays musical values.

Uses for Strip Silence

Noise Gate

The most conventional use for *Strip Silence* is the simulation of the classic noise gate effect. When used on long recordings with many gaps – such as vocals or instrumental solos – you can get good results by setting a low threshold value. Background noise is removed without affecting the main signal.

Creating Segments of Spoken Recordings

With spoken passages *strip silence* can divide a recording into sentences, words or syllables. For film synchronization or jingles you can move or reposition the segments of speech in a modular fashion.

With tempo changes you can also create »quasi time compression/ expansion« effect as the syllables automatically move closer together or further apart.

Creating Segments for Drum Loops

Dividing drum loops into small segments is a good way of perfectly synchronizing them. For example, with audio passages where the bass drum and snare are completely »separate« you can often use *strip silence* to isolate each individual beat. The new regions then behave exactly like MIDI events so you can alter the tempo and even quantize them.

If you have a SampleCell card you can import the regions of an audio file created by strip silence as individual samples. First you have to export (store in an SDII file) the region definitions of the audio files by choosing **File > Export SDII Regions**.

Optimizing the Synchronicity over long time-spans

Different computers, different synchronization sources (Internal or SMPTE code), different tape machines and — in theory — even different samplers or hard disk recording systems have slight variations in tempo. Changing just one component can lead to a loss of synchronicity in the recorded audio passages. This applies particularly to long audio sequences.

Here too the *Strip Silence* function can help by creating several shorter audio sequences with more reference points between the audio and MIDI events.

Please see also section *The Theory of Audio Synchronization* on page 9 - 14.

5.5   File Administration

Record File

Defining the Record Path

Every recording in the Arrange window creates a new audio file. To keep an overview of your recordings you should tell LOGIC Audio where the data should be written before you start recording.

You can also define a file name for the audio files that are recorded – a kind of working title – which LOGIC Audio can automatically keep using by adding a continuous number for every consecutive recording.

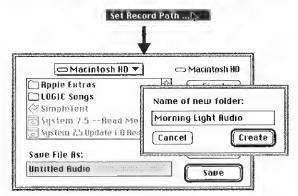To define the path choose **File > Set Record Path**.

The file selection box appears where you can choose a path, create a new folder and enter a working name. Click *Save* to confirm the settings.

Here is an example illustrating the individual steps:

It is usually advisable to store all the audio files from one recording session or song in a separate folder. Let's suppose the song you are working on is called »Morning Light«.

- Choose **File > Set Record Path**.

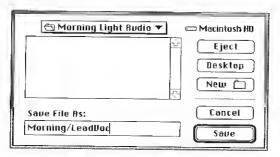- Create a new folder by clicking *New Folder* in the file selection box .

- Call the folder something like »Morning Light Audio« and click *Create*. The new folder opens automatically.

- Now enter a working name for the audio files. It is a good idea to enter a name which mentions the song and the type of recording. If you are recording vocals for the song »Morning Light« you could use something like »Morning/LeadVoc« as a working name.

Logic AUDIO

- Then click *Save*.

For every new recording a successive number is added to the name. For example:

Morning/LeadVoc.#01

Morning/LeadVoc.#02

Morning/LeadVoc.#03 ...

You can change the path and name whenever you want by calling up the *Set Record Path* function again.

Let's assume you want to record the lead guitar for our example song »Morning Light«. Enter a new name such as »Morning/LeadGit«.

When you choose the Path remember...
- The path definition is stored in the »Preferences«.
- If the hard disk to which the path leads is not connected or is switched off the path is deleted.
- If you rename the volume LOGIC Audio will not be able to find it!
- The same path/file name is used for all new songs until you set a new path for these songs.

Predefining the Length of the Recording
Unlike many hard disk recorders LOGIC Audio is always ready to record immediately. You don't need to wait or name every audio file before you can start recording.

This instant access is possible because LOGIC Audio has already created an audio file – so you don't have to do it yourself. If you don't make a recording this file is automatically deleted again without you even no-

ticing. However, you do have to predefine the size of this file – and thereby the maximum recording time.

Choose **File > Size Record File**. A small window then opens which shows you at the top how much memory is available on your hard disk. Below you can enter the required maximum recording time in minutes. To the right is a display of the memory requirement for the given recording time.

When you enter the Recording Time remember...

Important: the display of the remaining memory and the maximum recording time depends on the following factors:

• the number of tracks which are to be recorded simultaneously.

• the sample rate.

If you are starting LOGIC Audio for the first time this display refers to recording a single mono track.

After every recording LOGIC Audio makes any unused memory available for more recording.

Note   It is always advisable to choose a much smaller value than the maximum possible recording time. Otherwise after the first recording there will not be enough space for further recordings unless you reduce the value.

If you set a long recording time and then increase the number of tracks or change the sample rate and there is not enough room on the hard disk, LOGIC Audio will warn you first with an alert box.

Adding Audio Files

If you want to use an audio file stored on the hard disk in the current song choose **File > Add Audio File**.

An extended file selection box appears where you can choose one or more audio files at once.

If you are using Digidesign DAE hardware you can listen to an audio file before you load it. This window also contains extra information on the files, such as size, format and sample rate. In the Audio page of the »Preferences« you can decide whether you want to use this expanded box or the normal box from the operating system.

Click *Cancel* in the file selection box when you have finished choosing the files.

The file names will then be listed in the Audio window.

Audio files which have already been added to the current song are not shown in the file selection box. This gives you a better overview and also reflects the fact that you can't add the same file more than once to the Audio window. This does not restrict you in any way because you can create as many regions as you want – including identical ones – within any currently loaded Audio file.

Drag & Drop using Audio Files

The "Macintosh Drag and Drop Manager" in System 7.5 is now supported: you can drag any selection of audio files directly from the Finder into an open Audio window. The end result is exactly the same as using the *Add Audio File...* function. It can save you time especially with large multiple selections!

If you drag any audio file ending in »...(L)« or »...(R)« the other half of the stereo recording is automatically moved with it.

Unfortunately, at the present time this feature works only with files in the SDII format (not AIFF). SDII stereo files are not converted automatically. (For SDII stereo or AIFF files please use *Add Audio File...*).

Importing Tracks off an Audio CD from the CD-ROM Drive

If you want to digitally import a track (or part of one) from an audio CD you can make use of the fact that the QuickTime System expansion (contained in MacOS 7.5) stores "films without pictures" as AIFF files. LOGIC Audio can play AIFF files.
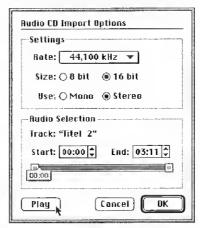
Here's how you do it

First you have to transfer the CD track onto your hard disk and convert it into an AIFF audio file:

1.   Go to the Arrange Window and choose **Options > Movie...**

2.   In the file selection box choose the track you want from the CD in the CD-ROM drive. (If the tracks are not listed check that the *Audio CD* System expansion is switched on.)

3.   Click *Convert...*
        (If you want to create an AIFF file from the whole

track go straight to paragraph "8.")

4.   Click *Options...* and this dialog box will appear:

```
┌─────────────────────────────────────┐
│ Audio CD Import Options              │
│  ┌─ Settings ──────────────────────┐ │
│  │ Rate: │ 44,100 kHz ▼ │          │ │
│  │                                 │ │
│  │ Size: ○ 8 bit   ◉ 16 bit        │ │
│  │                                 │ │
│  │ Use: ○ Mono  ◉ Stereo           │ │
│  └─────────────────────────────────┘ │
│  ┌─ Audio Selection ───────────────┐ │
│  │ Track: "Titel 2"                │ │
│  │ Start: │ 00:00 │↕│  End: │ 03:11 │↕│ │
│  │ ▣━━━━━━━━━━━━━━━━━━━━━━━━━━━▣   │ │
│  │ │ 00:00 │                       │ │
│  └─────────────────────────────────┘ │
│  ( Play )        ( Cancel ) [[ OK ]] │
└─────────────────────────────────────┘
```

5.   Make the *settings* as shown above. (Important: *Size* = 16 bit. *Rate* must match the sample rate, *Stereo/ Mono* depending on what you want)

6.   Define the section of the track you want using the *Start* and *End* locators. You can enter the values either numerically, by clicking the up/down arrows or by moving the marker on the bar. Click *Play* to check your selection.

7.   Click *OK*

8.   Enter a name for the AIFF file and choose a folder

9.   Click *Save*

10.   Close the Movie window, since you presumably don't want the audio file to play along with the LOG-IC song as a "film without pictures" via the internal hardware!

Now that the audio file is stored on your hard disk, you can add it – as usual – in the Audio window by choosing **Add > Audio File...**.

Removing Audio Files

To remove an audio file from the current song select its name in the Audio window and press ⌫. This does not delete the file from the hard disk.

Logic

Audio File Management

Save Regions as Audio Files

All selected regions can be saved to disk as separate audio files with **File > Save Region(s) As...** . A fileselector will prompt to choose the destination disk and folder. If only one mono or stereo region is selected you can change the filename. When saving multiple regions their names will be used as filenames (the fileselector will prompt a name like "123 regions to be saved").

Deleting Audio Files

In theory audio files are displayed and organized by the Macintosh operating system in exactly the same way as all the other Macintosh files. You can therefore delete or copy them in the Finder. However, this has the following disadvantages:

- If you delete an audio file you may not know if it is needed in a song.

- If you accidentally delete audio files LOGIC Audio warns you of this when you load the song. In addition, there will still be items in the Audio window and Audio sequences in the Arrange window which originally referred to the missing audio file and have therefore been »orphaned«. This detracts from a clear overview of the song.

For this reason it is safer to delete redundant audio files in the Audio window. First select the audio files which you want to delete. Please be careful because once files have been deleted they are gone for good. You cannot use the Undo function after deleting audio files!

Choose **File > Delete File(s)**. There is another alert message informing you of the number of audio files about to be deleted.

Delete File(s)

⚠ 4 selected Audiofile(s)
to delete from Disk.
Can't UNDO this operation!
Keep in mind other songs
may also use these file(s)!

Cancel   Delete

The Alert message before deleting several audio files.

Click *Cancel* to abandon the deleting process, or click *Delete* to permanently delete the files.

Warning   Here too you should make sure that the files about to be deleted are not being used in any other songs.
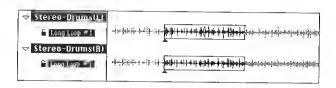
Optimizing Audio Files

The **File > Optimize Files** function allows you to delete those sections of audio files which are no longer required in the song. This can usually free up a lot of wasted space on the hard disk.

You can call up *Optimize Files* for any number of audio files. *Optimize Files* works as follows: for all selected audio files LOGIC Audio works out which segments are not contained in any of the regions. These segments are then deleted and the used regions are stored next to each other in the audio file.
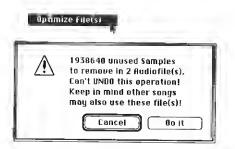
Important   The regions in the Audio window must be redefined by LOGIC Audio during this process. Therefore the song is automatically saved after *Optimize Files*!

Warning   Because this process deletes physical data from the storage medium you cannot undo it.

Unused audio passages out-
side the regions often take up
unnecessary storage space
and can be removed using
the *Optimize Files* function
– even several files at once.

Making Backups

The **File > Backup File(s)** function stores duplicates of files at the
same storage location (with the extension »dup»).

Don't forget the backup options available in the Sample Edit window.

Copying Audio Files

The **File > Copy File(s)** function copies files to a different location on
your storage medium. When you copy a file you can enter a new name
in the file selection box (similar to the »Save A Copy As...« command.

LOGIC Audio checks whether there is enough space for the copy/copies
of the selected file(s) at the target location. If there is already a file with
the same name there LOGIC Audio asks whether you want to replace it.
LOGIC Audio then also gives you the opportunity of replacing the audio
file in the song with the file that you just copied.

Moving Audio Files

The **File > Move File(s)** function enables you to move audio files on your hard disk. Unlike the copy function, the source file disappears afterwards.

If the source drive/partition is the same as the target drive/partition the files are simply moved to the other folder. This is a very quick and convenient way of organizing the drive and the song.

Example   Choose »Select Used« from the Edit menu of the Audio window (this refers to the files which are being used in the Arrange window) and move them to a new folder. This folder will then contain just the audio files from this song.

Note   Be very careful when using this function! A different song may use the same audio files! The next time you start you must localize the files that you moved.

Tip   LOGIC Audio amends the information on the new path for all open songs which use this audio file. Thus you can open every song which uses the audio files you are moving, then move the files to the new location and finally save the song to transfer the storage reference.

Special Features of the Stereo Format

The internal structure of multitrack HD recording systems is constructed so that each individual audio track can be dealt with independently. Accordingly a separate audio file is created for each track.

LOGIC Audio achieves stereo recording and playback by coupling two mono tracks and therefore two audio files. This is known as the **split stereo** format.

Other programs (particularly for mastering) create files containing both channels of a stereo recording. These are composed of a sequence of alternate small packets of data from both tracks. One example of this is stereo recordings made using the »Sound Designer II« program. This type of file format is called the **interleaved stereo** or **stereo format.**

Automatic Conversion of Stereo Files

When you are add a stereo sound file to the Audio window two mono files are automatically created.

The original stereo sound file is not deleted - LOGIC Audio generates two new independent mono files from the stereo sound file. Don't

forget that this process takes up twice the amount of memory on the hard disk.

The two new audio files are joined together in the Audio window to make a single »stereo unit«. Any edits which are carried out on one channel automatically affect the other channel too.

Special Features of Stereo Files

There are a few special features for dealing with the audio files relating to stereo recordings or stereo sound files:

- In the file selection box stereo audio files are treated as a single file even though strictly speaking they are two independent files.

- In the audio list you can see both files. They have the same name apart from the channel markings (L) and (R). If you rename one channel of a stereo audio file the file for the other channel is automatically renamed as well.

- Their regions can also be renamed.

- If you use the »Add Region« command to create a new region LOGIC Audio does this for both audio files.

- Any alteration made to either region is automatically transferred to the other region. This applies to the start point, end point and position of the anchor.

- If either of these regions is moved to the Arrange window to create an audio sequence this automatically applies to the other region as well.

Converting Different Split Stereo Formats

LOGIC Audio treats audio files whose name ends in ".L" or ".R" as stereo files. These "name extensions" are used by ProTools, Session or Sound-Designer II to identify "split stereo" files. LOGIC Audio's file management functions such as *Rename*, *Create* or *Revert to Backup* can also identify these endings.

Functions

Convert to SD II Stereo

This command lets you convert two audio files into a stereo file in the SD II format. This is useful if you want to edit the stereo file using another program such as Digidesign's Turbosynth or Arboretum's Hyperprism.

Select the audio files and choose **File > Convert to SDII Stereo**. If the files are coupled together they will be automatically converted.

LOGIC Audio automatically stores converted SD II files in the same location as the original mono files providing there is enough space on the hard drive.

Reconvert from SDII Stereo

This command is for converting SD II stereo files back into two mono files so that after editing them with an external program you can use them in LOGIC Audio again.

Precondition: the mono files must be already registered in the Audio window. (If not just add the stereo file which will be automatically converted).

Select the audio files (or one of them) and choose **File > Reconvert from SDII Stereo**.

The two audio files will be replaced by the externally edited stereo file.

Dealing with SDII Files

LOGIC Audio allows you to access the regions in SoundDesigner II files. (The SDII data format lets you store region definitions).

Import SDII Regions

You can import regions of SDII files into the Audio window. This is useful if you want to play regions from a long recording made using Sound Tools. Select the audio file and choose **File > Import SDII Regions**.

Export SDII Regions

This command allows you to export one or more selected regions from the Audio window into the SDII file. To export all the regions from an audio file just select the name of the audio file and choose **File > Export SDII Regions**.

Audio File Format Conversion

When you copy files using the **File > Copy Files(s)...** function you can define the format of the destination file.

All selected audio files can be copied into any of the following formats:

...*Original Type*:   The original format is used (SDII or AIFF).

...*SDII File*:   The copies are in the Sound Designer II format.

...*AIFF File*:   The copies are in the Audio Interchange File Format

...*Wave File PC*:   The copies are in the ».WAV« format.

Audio files in the latter format cannot be reimported or directly played on a Macintosh by LOGIC Audio. It is merely a suitable format for exchanging audio files between Macintosh computers and those running Windows.

Exchanging Audio Files between Mac and PC

LOGIC Audio Mac automatically converts the longer MAC OS file names into short file names in the DOS convention ("12345678.WAV"). If there is any danger of a conflict of names LOGIC Audio does not simply cut the name off but places a letter on the end.

Example:

"Bass+Drums 1" and "Bass+Drums 2" would both become "Bass+Dru.WAV". Therefore LOGIC Audio automatically assigns the names "Bass+Dr1.WAV" and "Bass+Dr2.WAV".

Windows 95 does support very long file names but most utilities for exchanging between the Mac and Windows do not (e.g DOS Mounter, Formatter 5 and most Net software).

To transfer a whole LOGIC song from LOGIC Audio Mac to LOGIC Audio Windows just go to the Audio window and copy all the audio files onto the MS-DOS drive or the PC net (if available). The song file itself can be read immediately on both platforms.

LOGIC Audio Windows will recognize a song which was created on a Mac and looks for "FileName.WAV" instead of the original SDII files.

Likewise to transfer from LOGIC Audio Windows to LOGIC Audio Mac, you have to export the audio files from LOGIC Audio Windows as AIFF files (onto the Mac/HFS drive). LOGIC Audio Mac then looks for "FileName.AIF" files instead of "FileName.WAV" files which would be used on the PC.

Note: store the LOGIC song file in the same folder as the audio files. Then LOGIC Audio (Mac or Windows) will find the audio files straight after loading.
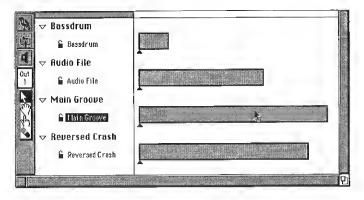
Other Functions involving Audio Files

Fragmentation Analysis

The **File > Analyse Fragmentation** function allows you to analyse the fragmentation of selected audio files on the hard disk.

Reassigning Audio Files

If LOGIC Audio cannot find one or more audio files – for example when it opens a song – the regions are shown as gray areas in the Audio window.

If the files are available under a different name or if you want to assign a »replacement file« you can do this as follows:

Double-click the relevant region or choose **File > Update File Infor-mation**.

```
+-------------------------------------------+
|  +--+   Do you want to locate             |
|  |🗋|   the Audiofile                     |
|  +--+   "Main Groove" ?                    |
|                                            |
|        ( Cancel )  (( Locate ▶ ))          |
+-------------------------------------------+
```

Choose *Locate* in the dialog box and a file selection box opens where you can load the desired audio file. Please refer also to the section be-low on What do you do if LOGIC Audio cannot find an Audio File?.

What do you do if LOGIC Audio cannot find an Audio File?

Sometimes LOGIC Audio cannot find a file which was previously used in the song. This could be due to one of the following causes:

- You have not connected the relevant hard disk or you have re-named the volume .

- You have stored the files in a different volume or moved them to another volume

- You have renamed the files in the Finder or renamed them in the Audio window of another song

- You have deleted the files

In this case LOGIC Audio produces this dialog box:

```
+-------------------------------------------+
|   /!\    Audiofile                         |
|  /   \   "Bassdrum"                        |
| /__•__\  not found!                        |
|                                            |
| ( Search ) (( Skip )) ( Skip All )         |
+-------------------------------------------+
```

You can respond in any of the following ways:

Search

The current volume is searched for this name. If the search is unsuc-cessful LOGIC Audio asks you if you want to search other volumes for these files. This enables you to assemble songs even if you have copied or moved the relevant files onto other media.

Skip

(Don't search for this file). Use this function if you know that this audio file no longer exists or has been renamed. This button changes to »Skip All« if after the first skip yet another audio file could not be found.

Skip All

(Don't search for any more files). Use this function if you know that all audio files in this song no longer exist or have been renamed.

Manually

You can manually define where to search for the file.

When searching for audio files (whether manually or because LOGIC Audio cannot find a file at the expected position) LOGIC Audio searches only those hard disks to which the hardware has access. This is because:

Session 8 or ProTools II/III systems can only play audio files from hard disks connected to the SCSI bus of the disk I/O card,

CBX systems can only play audio files from hard disks connected to the Macintosh internal SCSI bus.

5.6   Functions

Audio Record

You can call up the Environment Layer containing the audio objects via the Options menu in the Audio window (**Options > Audio Record/ Returns**).

Choosing the Sample Rate

In the Options menu of the Audio window you can choose one of the available sample rates, for example 44.1 kHz or 48 kHz. (If you are not sure which one you need please refer to section *Sampling Rate* on page 9 - 24).

Important   The set sample rate is global and applies to the playback of all audio files in the current song. It is not possible to play different audio files simultaneously using different sample rates — even if they were re-corded like that!

EMAGIC

If you have loaded several songs with different sample rates LOGIC Audio can automatically take account of this when you switch songs.

Converting the Sample Rate
LOGIC Audio can digitally convert sample rates:

- Double-click a region in the Audio window to open the Sample Editor.

- Press ⌘Ⓐ to select the whole file.

- Choose Factory > Sample Rate Convert.

- Enter the desired sample rate in Hertz next to Destination (Hz) (e.g. 44100), and

- Press ↵.

For more detailed instructions see section *Sample Rate Converter* on page 7 - 12.

Refresh Audio Hardware
You can rebuild your Audio Hardware Settings with the Key Command *Refresh Audio Configuration*.

Normally this command is not needed, but it's useful if you are working with "buggy" audio driver software.

The following results will occur when this command is used:

In the case of CBX, all Parameter settings will be sent again. In the case of ProTools, the complete virtual TDM mixer will be reset and rebuilt – including all Plug-Ins.

Chapter 6
The Sample Edit Window

The Sample Edit window offers an enormous number of data-editing functions which you can use to process individual audio files. You can also edit stereo files.

You can set the lengths of audio regions with extreme precision (down to single-sample resolution) by making use of the window's adjustable zoom resolutions. The anchor can also be positioned here with the same degree of accuracy.

6

Opening the Sample Edit Window

There are various ways of opening a Sample Edit window:

*   Choose **Windows > Open Sample Edit**.

*   Press ⌘⓪

*   Double-click on any audio sequence in the Arrange window; this takes that sequence into the Sample Editor.
*   Double-click on any region in the Audio window; this takes that region into the Sample Editor.

If no region or audio sequence is selected, LOGIC Audio will ask if you'd like to load a new file into the Sample Edit window.
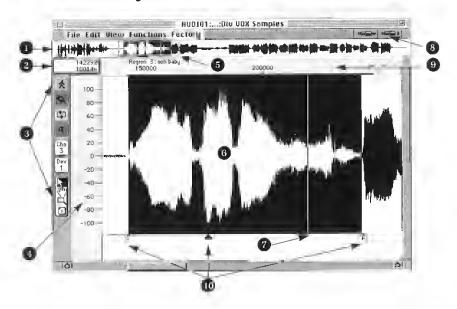
If you're dealing with the regions or audio sequences for a stereo pair, both channels/audio files will be displayed in the Sample Edit window beneath one another.

You are kept informed while in the Sample Editor whether the window whose contents you are editing was opened from the Audio or the Arrange windows, and whether there is a connection to a particular bar position as a result.

You can tell all of this from the position marker lines up in the bar ruler; a dotted line indicates no time connection (Audio window), while a broken one indicates a time connection for the region which is being used as an audio sequence in the Arrange window.

6.1 Layout

● This is the overview; the entire audio file is depicted here.

● This is the parameter box for the current selection, and shows the start point and length of the selected area.

● The *Catch* (Man symbol) ensures when activated that the playback position is always visible in the window. The other controls operate as in the Audio window.

● Amplitude Scale (readings in percent or 16-bit decimal values).

● The dotted frame shows the extent of the section visible in the

● Detailed waveform display.

● Playback position line (also visible in the overview).

● The zoom telescopes are used to set the magnification used on the detailed waveform display.

● The horizontal time ruler displays the name of the edited region in the top left. Beneath that is the time position in the audio file, in various formats. By clicking and holding the mouse button, Scrubbing can be engaged, if your hardware supports it.

● The Start point, Anchor and End point of the currently selected region can be changed by simply grabbing and dragging them.

Logic

6.2 Display
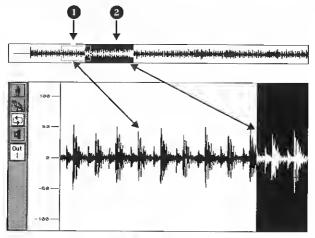
Overview

Between the Sample Edit window's title strip and bar ruler is the so-called "Overview". This display always shows the full length of the currently selected audio file, irrespective of the zoom resolution set by the telescope symbols. Please note that no idea of scale is given in the overview; a kick drum sample lasting 0.3 seconds could take up the same space here as a choral passage lasting 15 minutes.

During playback, the current position is indicated by a line moving in real time. This is visible in both the overview and the detailed waveform display.

The current selection is also displayed in the overview.

The section visible in the detailed waveform display is shown in the overview as a dotted rectangle.

The overview: the dotted box ❶ shows the section of window currently displayed in the detailed waveform display. Part of the selection ❷ is also visible.

Functions in the overview

A short mouse click on the overview brings the area clicked on into the detailed waveform display.

A long click on the mouse resumes playback from this position. Releasing the mouse button halts playback once more.

Double-clicking lets you monitor the sample from the position clicked.

Window functions

The Catch and Link functions work in pretty much the same way as in the other edit windows.

Catch Mode

Catch mode ensures that the Sample Edit window always displays the area around the current playback position (whether you are playing the song or monitoring the sample). *Catch* is turned on and off either by clicking the switch with the "walking man" symbol on it or via the key command.

Link Mode

Link mode ensures that any audio sequences displayed in the Arrange window are also displayed in the Sample Edit window. *Link* mode is turned off and on by clicking the switch marked with the "linked chain" symbol or via the key command.

If you often work in Link mode, give this a try: open a Sample Edit window and switch on Link mode. Now close the window. LOGIC Audio now leaves Link mode permanently on.   Tip

Double-click on the audio sequence you want. You can see straight away that the display in both windows is linked.

The Detailed Waveform Display

Display Scale

The Zoom Telescopes

You can use the left-hand telescope symbol to magnify or reduce the vertical scale of the display area, which alters the amplitude of the detailed waveform display.

The right-hand telescope is used to enlarge or reduce the horizontal scale, i.e. that of the time axis.

You can also use the global key commands.

Logic
AUDIO

If you press ⌘ while operating the telescopes with the mouse, you'll be able to change the vertical and horizontal scales simultaneously.

The Zoom Tool
Just as in the other windows, there is a zoom tool in the Sample Edit window toolbox (the magnifying glass). If you use this tool to draw a rectangle, the selected area of the window will be magnified so that it fills the whole screen. You can also repeat the action. Clicking the mouse once returns you to the previous zoom resolution.

You can access the zoom function even more quickly by pressing ctrl if the pointer tool is selected. But before you can draw a magnification box, you have to click on an empty space in the window.

X- and Y-Axes Scales

6

The Y-axis has a vertical scale showing the waveform amplitude in per-centage units (obtained by selecting **View > Amplitude Percent-age**). On the other hand, if you select **View > Amplitude Sample Val-ue** the scale will be displayed in sample units.

The X-axis (the time ruler) shows the course of the audio file over time. You can select various units for this scale by using the **View** menu:

Don't forget that this display format also affects the figures shown in the Info line and the selection parameter field:

View > Samples
Displays the sample word number from the beginning of the song or audio file.

View > Min:Sec:Ms
Gives the scale in Hours:Minutes:Seconds:Milliseconds from the begin-ning of the song or audio file.

View > SMPTE Time
Gives the scale in SMPTE time (in Hours:Minutes:Seconds:Frames). The time scale begins at the song start, with the SMPTE offset. When you use this scale, the absolute SMPTE value of the source clock is shown on the X-axis.

View > Bars/Beats...
Gives the scale in Bars, Beats, Divisions and Ticks, like the bar ruler in the other time-related windows. The "Zero point" is represented by "1 1 1 1", but lengths are measured from "0 0 0 0".

Please note that this scale also affects the figures shown in the Info line and the selection parameter box.

Absolute and Relative Time

The different axis scales in the Sample Edit window can be displayed on the basis of one of two different reference values:

- by reference to the time axis of the song (absolute position)
- by reference to the beginning of the audio file (relative position)

Relative Position

You can recognize this format by the dotted line below the units in the time axis (between the Overview and the waveform display).

You get this if you open the Sample Editor from the Audio window, or if the Sample Editor is in Link mode and you select a region in the Audio window.

The beginning of one of these sections is automatically assigned the value zero, or in Bar/Beat terms, "1 1 1 1". Please note that this does not have to match the actual song position! The calculation of all remaining musical sections is then done using the current song tempo.

Absolute Position

You can recognize this format by the broken line below the units in the time axis.
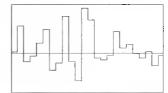
You get this if you open the Sample Editor from the Arrange window, or if the Sample Editor is in Link mode and you select a region in the Arrange window.

Time is measured from the start of the Song, which is given the value zero (or 1 1 1 1 in Bar/Beat terms). In this instance the time axis shows the absolute (song) time and the figures do not refer to the audio file!

Display Waveform as Sample Bits

At high magnification on the detailed waveform display, you can switch over from the usual representation of the waveform to one that shows the structure of the digital data you have recorded. You do this by selecting **View > Show as Sample & Hold**. This way of displaying the waveform can be useful, for example when eliminating clicks and pops from your recordings

However, thanks to the clever use of oversampling techniques and low-pass filters at the D/A conversion stage, the stored sample bits (on the right) are ultimately converted into a signal waveform more like the one shown on the left.

6.3 The Sample Edit Window In Use

Monitoring Sample Playback

There are various ways of playing back the sections of audio visible in the Sample Edit window, so you can check audio as you edit it. Playback occurs independently of the position of the sequencer in a Song. If, on the other hand, you'd like to hear the selected audio passage in the context of the whole song, you'll have to use the transport controls as usual.

6

Playback from the overview

Monitoring playback from the overview display is carried out in exactly the same way as with regions in the Audio window. Simply clicking on the point you want with the mouse starts playback from that point. Releasing the mouse then causes playback to stop. You can also start monitoring from any position by double-clicking there.

Playing the whole audio file

The keyboard command *Play/Stop All* allows you to play back a whole file irrespective of the current selection.

Playing the current selection

To play back the current selection, click on the switch depicting a small loudspeaker.

Instead of doing this with the mouse, you can also perform this function with the keyboard command *Play/Stop Selection*.

Playback from a certain position

If you double-click on any point in the time axis, the audio file will play back from this point to the end of the current selection. If you double-

click on a point beyond the selected area, the audio file will play right to its end.

Cycle Playback Mode

On the left-hand side of the Sample Edit window, just above the Loud-speaker symbol, is the Cycle button. If you turn this on, the currently selected passage of audio will cycle continually when playback monitoring is engaged.

Tip   Please note that you can change the start and end points of the selected area while monitoring it in cycle playback mode! In this way, you could edit the start and end points of (say) a drumloop until it loops perfectly. When you're satisfied, you make the selection into a new region with the function **Edit > Selection→Region**.

Choosing the Audio Output

You use the small boxes under the loudspeaker symbol to choose the hardware and the output number you're using for monitoring. If you're editing a stereo file, the right channel will be sent to the next-highest available output channel.

Set the number of the output you want to use in the *Cha* box under the loudspeaker symbol. You use the *Dev* box just below it to choose between different kinds of hardware if you have more than one type installed (if not this switch will not even appear!).

In this case, you should spread the pan positions of both channels as   Tip
widely as possible in the Environment.

Playing Regions

You can only play currently selected parts of files from within the Sample Edit window! If you wish to play back a region, you must first select it by using the function **Edit > Region→Selection**.

When you open the Sample Editor by double-clicking an audio sequence (or region) this region will automatically be selected in the Sample Editor. The same thing happens when you click a region/audio sequence while the Sample Editor is in Link mode.

Scrubbing

Scrubbing is only possible at present if you have DAE hardware.

Click on the time axis and hold down the mouse button. If you now move the mouse, the recording should play back following the speed and position of the mouse.

More parameters can be set on the **Audio Extension** page of the **Preferences**. For more information, see the section *DAE,* on page 8 - 9).

Automatic Scrolling

You use the scroll strip on the bottom and right edges of the Sample Edit window to scroll through the detailed waveform display in the usual way. However, if you're trying to reach one of the following points in the audio file, some of the keyboard short-cuts shown below should be of use to you. You can define your own keys for these commands from the Key Commands window (see the LOGIC handbook for more information) if you wish. The ones shown here are the defaults.

Scroll screen to:	Key command name	Key
Start of selection	*Goto Selection Start*	⊟
End of selection	*Goto Selection End*	⊟
Start of region	*Goto Region Start*	
End of region	*Goto Region End*	
Anchor	*Goto Region Anchor*	

These commands bring the required point to the centre of the screen.

Making Selections

Selecting the Whole Audio File
You can select the whole of an audio file with the function **Edit > Select All** (⌘Ⓐ).

Manual Selection
To select a particular section of an audio file, click on the start or end of the area you want to select, hold down the mouse button, and move the mouse to the right or left.

To change the start and end points of a selection
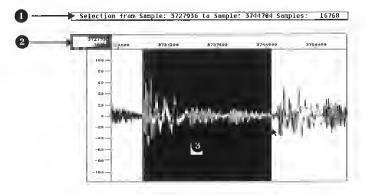
By clicking on a selection while holding down the ⌨ key, you can change its existing boundaries at any time. Whether you change the start point or end point by doing this is determined entirely by whether the point you clicked on was closer to the start or end of the selection. The closer one wins!

Moving the whole selected area

If you hold down ⌨, you can shift the whole selection without changing its length.

The Selection Parameter Box

Please note that the start point and length of the current selection are shown in the selection parameter box at all times.

The Relationship between Selections and Regions

When you open the Sample Edit window by double-clicking on a region (in the Audio window) or audio sequence (in the Arrange window), the Sample Edit waveform display at first shows just the area double-clicked on. Changing the selection has no direct effect on the borders of the actual audio region. Even the playback monitor only plays back the current selection.

So that you can create and edit regions with the minimum of fuss, LOGIC Audio offers two functions that govern the interaction between selections and audio regions.

EMAGIC

Selecting the Region

By choosing **Edit > Region→Selection** , you select the entire region currently in the Sample Edit window. The current region is the one selected in the Audio window (or the region belonging to the audio sequence selected in the Arrange window).

This function is useful if, for example, after editing it in various ways, you want to select the whole region again so that you can put it into Cycle Playback Mode.

Turning a selection into a Region

If you wish to make your current selection into an audio region, choose **Edit > Selection→Region**. In this way, you can take an audio passage you like , define it as a selection, and then convert it to a region and use it as the start and end point for the current region.

Creating new regions

To define a new region from an area you've just selected, choose **Edit > Create New Region**. You can define this function as a keyboard command. (SoundDesigner II users, take note: this command is the equivalent to ⌘𝐅.)
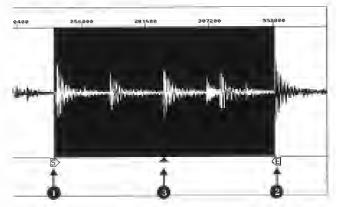
Editing Regions in the Sample Editor

If accuracy is what you need, you should edit the start and end points of regions in the Sample Edit window, not the Audio window.

The same goes for any adjustments you make to the anchor, which (to give a concrete example) should really be placed on the amplitude peaks where recordings of brass instruments are concerned, not at the start of the attack phase. The flexible zoom settings allow you to be as precise as you like, going right down to the level of single bits at the highest magnification.

The small markers on the lower edge of the waveform display allow you direct access to the boundaries of the region and the anchor. As usual, you can just grab 'em and pull!

- ❶ Region Start
- ❷ Region End
- ❸ Anchor

Protecting the Anchor point

If you move the start or end points of a region past the anchor point, the anchor point will also move, However, this is not always what you want to happen.

Holding down the [⌫] key while you move the start or end markers of a piece of audio prevents the anchor from moving.

Search Zero Crossings

If this editing option is switched on, LOGIC Audio will search for the nearest zero point in the waveform every time the start or end points of a selection are changed, to avoid glitches in playback. The program looks before the start point and beyond the end point.

Editing commands

Like the other windows, the Sample Edit window features the usual edit commands **Cut, Copy, Paste, Clear** and **Undo** under its **Edit** menu (or via the keyboard).

Logic

Please note: in the Sample Edit window all these commands (except **Copy**) change the data on the audio files itself; in other words, they behave destructively. Consequently, they cannot be reversed using the "Undo" command.

Cut (⌘🗵)

cuts a selected passage out of an audio file and copies it to the Clipboard. All the following sections of audio move forward to fill the gap.

Copy (⌘🗵)

copies a selected passage to the Clipboard.

Paste (⌘🗵)

Inserts the contents of the Clipboard at the cursor position or start point of the selection. If there is no selection available, the cursor acts as the paste point (it is shown as a thin dotted line). If audio data is present behind the paste point, it is moved back to make way for the Clipboard contents. If anything was selected and still highlighted at the time of the paste, it is deleted and replaced by the Clipboard contents.

Clear (🗵)

Erases the selection without placing it in the clipboard. All data beyond the deleted passage is pulled forward to fill the gap.

Undo (⌘🗵)

Cancels the last edit command used, and reverses its effect. This also works with the destructive editing commands described in the section *Functions,* on page 6 - 15 or described in Chapter 7 *The Digital Factory™.*

Remember that the Undo function in the Sample Editor is organized separately from the rest of the program. This means you can try out the edit in the Arrangement. If you don't like it you can go back to the Sample Editor and reverse the edit using the Undo function!

Note

6

6.4 File Management

Backup Copies

Automatic Backups

Before you carry out a destructive edit on an audio file in the Sample Editor, LOGIC Audio will ask you if you wish to make a backup copy of the file you're working on, unless one exists already.

The *No Dialog* button ensures that this question will not be asked again while you are editing in the current window.

You can even turn off the question altogether from the **Audio Settings** page in the **Preferences**. In this case the question will be asked only when the program is loaded, and when you carry out your first edit. You can reply as follows:

Process
No backup is made and the edit goes ahead. You won't now be asked the question again until the next time you boot up LOGIC Audio.

Cancel
Stops the Edit.

Preferences
Opens the Audio Preferences window and gives you the chance to re-instate the Backup question dialog box every time you go to make a destructive edit.

Manual Backups

You can make manual backups of one or both of the files you're editing, or replace it/them with a backup version at any time you like – and you can do it from the Sample Edit window with a variety of functions:

File > Create Backup
Creates a duplicate of the audio file you're working on (with the extension ".dup") and places it in the same folder, on the same level.

File > Revert to Backup
This function completely replaces the current audio file with the backup (provided one exists, of course). A warning message informs you of the creation date of the backup file before the current file is replaced.

Please note that you cannot reverse this function with Undo!

Important

File > Save A Copy As...

Copies the current audio file to a location of your choice.

File > Save Selection As...

Saves the current selection as an audio file in its own right. After it has saved, you can choose whether you wish to bring the file into the Audio window.

6.5   Functions

6

The following section describes various useful functions available in the Sample Edit window for perfecting audio recordings. You can use these to add the finishing touches to your work.

Each of the commands affects only the currently selected audio. If you want to use them to alter the whole audio file, you have to use the *Select All* function beforehand.

All of the following functions are destructive, so they change files stored on your hard drive. You can use the Undo function — but only until you make another destructive edit. So you could, for example, change the start and end points of the selected audio in between, without losing your undo facility.

Since the Undo function in the Sample Editor is independent from the rest of the program you can try out an edit in the Arrangement and make changes there. As soon as you open the Sample Editor again (or bring it into the fore ground) the Undo function is available for the last destructive sample edit.

Before these functions are executed, you are asked to confirm them as a safety measure. This confirmation dialog box can be turned off by choosing **File > Preferences > Audio >** *Warning before process Function in Sample Edit (Menu).*
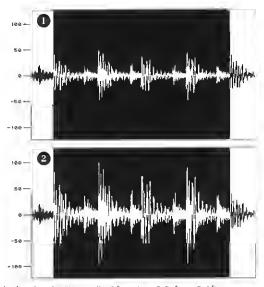
Data altering processes can be cancelled while underway with ⌘.. The audio file will be retained in its original state, even if it appears that some of the editing function has been carried out.

LOGIC Audio's more complex editing functions are stored in the **"Factory"** menu, which is described in Chapter 7 *The Digital Factory™*.

Normalize

Normalization is the process by which a digital signal is bought up to its highest possible level without introducing distortion. Normalizing is possible in LOGIC Audio by selecting **Functions > Normalize**.

This is done in the following way; LOGIC Audio finds the point with the highest volume (-xdB) in the currently selected audio, and determines how far this is from the maximum possible level. The level of the whole selection is then raised by this amount. The sound of the audio passage remains unaltered — it merely gets louder.

Example showing the "Normalize" function. ❶ Before ❷ After
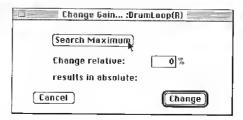
Tip Please note that the start and end points for the section being normalized should not fall within a continuous section of audio, as this will result in abrupt increases in volume after normalization. the start and end points should therefore be located in sections surrounded by pauses. Now and again you should remove any unwanted, audible noises that fall in gaps in the music with the aid of the "Silence" function.

Logic

Change Gain

You can use **Functions > Change Gain** to raise or lower the level of a passage of audio by a specific amount.

```
Change Gain... :DrumLoop(R)

  ( Search Maximum )

  Change relative:        0 %
  results in absolute:

  ( Cancel )              ( Change )
```

A dialog box appears in which you can set the required level change in percent (*"Change relative"*).

If you click on *Search Maximum*, the highest peak level is determined and the value is then calculated that would be used to normalise the audio file.
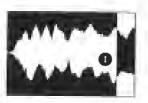
The value *"results in absolute"* then show the maximum level that would be achieved by changing the gain by the amount shown in the *Change relative* box.

The gain change is effected by hitting *Change* (or ⏎).

Fade in

You use **Functions > Fade In** to create a fade in. You set up the period of time over which the fade-in will occur with the help of the currently selected audio (as shown in 1 and 2). Volume is set to zero at the left start point of the selection, and the fade-in occurs over the length of the selection.
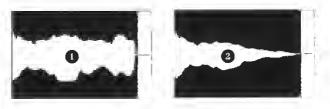
Example showing the "Fade In" function. ❶ Before ❷ After

Fade out

Functions > Fade out works in e the same way as Fade In, except that the fade works in the opposite direction. This lets you fade passages out automatically.

Example showing the "Fade-Out" function. ❶ Before ❷ After

Fading Tips

Tip

1: Common-or-garden fades (like the typical fade-out at the end of a track) can also be achieved with the help of fader objects in the Environment, or with Hyper Draw. The advantage of using MIDI volume to achieve the fade is that your audio doesn't need to be edited in any way.

2: If you use the Silence function (see below) to remove unwanted background noise from silent passages, small jumps in volume can sometimes appear at the start and end points of selections, as well as on the flanks of the audio signal. In this case, select only a small area (e.g. within and just in front of the flank of the signal) and then use the "Fade-in" function.

Silence

You use Function > Silence to mute as many sections as you wish. The waveform material contained in the selected audio passage and the corresponding amplitude values are all set to zero. You can use this function to silence the unwanted background noise in quiet passages.
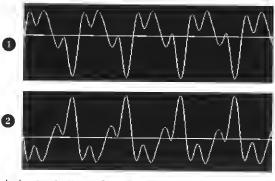
Example showing the "Silence" function. ❶ Before ❷ After

.·Logic

Invert

Functions > Invert completely reverses the phase of all the currently-selected audio material; all negative amplitude values become positive and vice versa. Whilst this doesn't change the file audibly if it is heard in isolation, you can use *Invert* to correct phase cancellation errors, particularly if you're mixing down into mono. This is particularly valuable when several out of tune signals (or several signals processed with chorus pedals) are to be mixed down to mono together. The effect depends on the audio material.

Example showing the "Invert" function. ❶ Before ❷ After

Tip for Sound Engineers:

Tip

You can use the Invert function to decode MS recordings. Copy the S-channel's audio file using **File > Copy File(s)** in the Audio window (call it "Name -S"). Open up the copied audio file and reverse the phase completely (Sample Editor ⌘Ⓐ, plus **Functions > Invert**). Create 3 tracks with audio objects entitled "S", "M" and "-S". Set the pan positions for S, M, and -S to Left, Centre and Right respectively. Drag the audio files into the Arrange window and set the level during playback by ear (the output levels should be approximately -3dB for "S" and "-S" , and 0dB for "M"). Select the audio sequences and use **Structure > Merge > Objects/Digital Mixdown** to create "L" and "R" audio files .

Reverse

You reverse the selected audio passage by choosing **Functions > Reverse**.
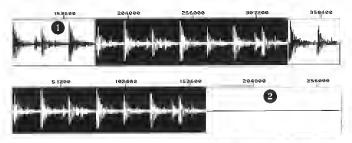
Example showing the "Reverse" function. ❶ Before ❷ After

Trim

By choosing **Functions > Trim** you can erase all the regions that aren't selected. Use "Trim" to remove unimportant passages from the start and end of your Audio Files.

Example showing the "Trim" function. ❶ Before ❷ After

Remove DC Offset

When using poorly constructed audio hardware, direct current (DC) can be undesirably layered over the audio signal. This results in a vertical shift in the waveform position, which can be clearly seen in the Sample Editor. During playback, this can cause crackling sounds at the start and end of the audio region.

Waveform with **❶** and without **❷** DC Offset

With **Functions > Remove DC Offset** it is possible to recenter the waveform around the zero line to avoid crackling at cut points.

Search Peak

When you choose **Functions > Search Peak** the currently selected audio is searched for the sample bit with the greatest amplitude value. The cursor in the waveform display is then placed on this bit.

Search Silence

When **Functions > Search Silence** is chosen, the selected audio is searched for sections containing silence ("digital zero"). The cursor is then placed at the start of the first section found that fits this description.

Chapter 7
The Digital Factory ™

One of the most remarkable and innovative features of LOGIC Audio is the Digital Factory™. This allows you to edit the selected areas in audio files (e.g. regions or whole audio files) using a whole range of complex functions.

Nearly all these functions are destructive which means that the data in an audio file on the hard disk will be permanently altered. However, the Undo function is available if you need it. You can also ask for a backup file to be automatically created before you edit the file, or do it manually.

All functions in the Digital Factory can be performed on any size of mono or stereo files in the SDII format.   Note

Please refer to the supplied Digital Factory tutorial files for a *hands on* use of these various functions.

Overview

Time Machine

Independent alteration of the pitch and length of a recording (pitch shifting and time compression/expansion).

Groove Machine

Rhythmic-dynamic time compression/expansion based on a definable swing grid.

Audio Energizer

Increase of the perceived volume, even with recordings made at a maximum *Normalized* level.

Sample Rate Converter

For adjusting the sample rate or creating unusual pitch effects.

Silencer

Digital single ended noise reduction (dynamic filter and expander) plus spike reduction (declicking).

Audio to MIDI Groove Template

Creates a MIDI groove template (quantization grid) from rhythmic audio material.

Audio to Score

Generates MIDI data from monophonic audio material.

Quantize Engine

Like the Groove Machine, but using any groove template.

Operation

The functions of the Digital Factory™ are available via the **Factory** menu in the Sample Edit window.

Operation

- Open the Sample Edit window by double-clicking an audio sequence in the Arrange window or a region in the Audio window (or for a selected audio sequence/region by pressing ⌘🄾).

This selects the region to be edited.

- Or: select the area to be edited.
- Or: press ⌘🄰, to edit the whole audio file.

The functions always affects the selected area!

- Choose **Factory > (Name of the function)**.

- Make the desired settings in the float window that appears.

With some Digital Factory functions you can use the *Prelisten* button to get a rough idea of the expected result. (Not available for all digital audio hardware!).

- You can start playback if you want to. Even though the functions alter the data in the audio file they can still be applied while the file is playing!

- Click the edit button in the bottom right, e.g. *Process & Paste*.

The description of the edit button varies according to the function.

The top line of the Sample Edit window keeps you informed about what the function is doing.

The selected area of the audio file is replaced by the edited audio material.

Options

- By choosing **Edit > Undo** (or ⌘Z) you can compare the edit with the original whenever you want. In the meantime you can work in the Arrange window, because the Undo function of the Sample Edit window operates independently of the rest of the program.

- You can repeat the edit with other regions or audio files. You don't have to close the chosen Factory 'Function's window and reopen it – it always carries out the edit on the selected material.

- You can also use the flip menu at the top edge of the window to switch directly between the individual functions of every section of the Digital Factory. The two sides of the **Factory** menu (separated by a horizontal line) divide the Digital Factory into "Machines" (large float window) and "Functions" (small float window).

If you are playing your song (using MIDI and audio data) while you are editing the audio material, owners of slower computers may experience slightly »jerky« playback of the audio material although the MIDI playback will continue to function correctly. The editing time also increases slightly if the song is playing.

7

7.1   Machines

The top section of the Factory menu contains all the data-altering functions for editing the sound and rhythm and converting the sample rate.

Time Machine

The Time Machine allows you to radically alter the time structure of the audio files ,including time compression/expansion and pitch transposition. When changing the pitch you have the additional opportunity to correct the alteration of the sonic character commonly known as the "Mickey Mouse" effect.
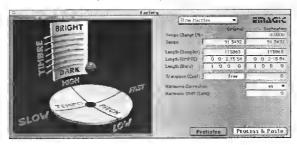
Overview of the features of the Time Machine:

- TIme compression or expansion without transposition,
- Pitch transposition with or without altering the length and tempo,
- Correction or alteration of the timbre (sonic character),
- Any combination of these functions.

Consider the Time Machine to be a universal tool for the control of pitch, tempo and the sonic character of digital recordings. Each of these parameters can be addressed independently. The current settings are visually represented by the position of a ball in a 3-dimensional graphic where the axes are time, pitch and timbre (sonic character).

Opening the Time Machine

To open the Time Machine choose **Factory > Time & Pitch Machine**. For instructions on selecting the affected area and basic operation please refer to section *Operation* on page 7 - 2.

Parameters

Most of the parameters are mutually dependent; you don't need to enter them all to get a good result. We suggest that you don't adjust a parameter unless you know what the value should be.

On the left side under *Original* you can see the present value, and on the right under *Destination* enter the desired target value for the edit.

Tempo Chonge (%)
Tempo alteration in percent. (There is no original value here).

Tempo
Tempo in bpm (beats per minute). Make sure you set the right length in bars otherwise the correct original tempo will not appear here on the left!

Length (Somples)
Length in samples.

Length (SMPTE)
Length in SMPTE time.

Length (Bors)

Length in bars. If you have already adjusted the song tempo to the region which you are about to edit, the original value will automatically be set correctly. Otherwise you have to enter the original length manually here.

Tronspose (Cent)

Transposition of the sound material in 1/100 semitone units (cents).

Free Transposition

Next to the transposition parameter you will see the description *Free*.

This will probably be the most common setting when you use the Time Machine. It means that the program carries out »free« compression/expansion or transposition. In this situation, the pitch and tempo of the audio material to be edited are completely independent.

Classic (correlated) Transposition

Here you can switch via a flip menu from *Free* to *Classic*. The *Classic* mode is for situations where you simply want to transpose a selected region by a certain amount to fit the tempo of the audio material. This produces the effect which you may be familiar with from changing the speed of a tape: the pitch, sonic character and playback speed change together.

On the left of the Time Machine's dialog window you can see a graphic representation of the current settings. You can grab the ball within the graphic and freely move it to adjust the compression/expansion and pitch shift. The further the ball deviates from the center position, the harder the algorithm has to work and the lower the expected sound quality will be.

Remember that the Time Machine is optimized for achieving a high sound quality at the expense of the exact specified tempo, so there may be a minor deviation from the destination tempo.

Note

Remember also that the quality of the result depends greatly on the source material used.

Don't let this fact hold you back from experimentation. Feel free to try extreme settings for compression/expansion or transposition. In such case, the result may best be viewed more as an "effect".

Harmonic Correction

By activating *Hormonic Correction*, the formants which define the timbre (sonic character) are corrected. With *Hormonic Correction* set to On the formants in the transposed material remain unchanged. This

means that the original timbre (or the physical size of the resonance body) will be maintained, and the transposition will therefore sound more natural. The only trade off: The calculation takes more time.

By switching the *Harmonic Correction* to *Off* the complete spectral structure (including formants) of a sound will be shifted along with the transposition value. This is the "normal" type of transposition well known from the previous Time Machine, other programs or the pitch shift algorithms of effect processors. These algorithms are also included within Time Machine II, and can still be used for much faster calculations when necessary.

Harmonic Shift

If *Harmonic Correction* is activated, you can also use the *Harmonic Shift* parameter to independently alter timbre. The units are *Cents* – exactly like Transposition. 100 *Cents* are 1 semi tone.

If you choose the same value in both *Harmonic Shift* and *Transposition* then no correction will be carried out and the result is as if *Harmonic Correction* is switched *Off*.

If you choose *Harmonic Shift* = "zero" then the formants do not change. This avoids the unwanted side effects of traditional pitch shift algorithms.

If you set *Harmonic Shift* to (e.g.) *-300* and *Transpose* to "zero" the sonic character of the material will be changed as though it has been transposed three semitones down – but without an actual transposition in pitch. This means a musical "C" remains a "C" but the timbre of the sound (for example, a voice) becomes darker.

Using the graphic

You can move the ball in the 3-dimensional graphic with the mouse. Naturally, only two dimensions can be accessed at once; use the ⬧-key to switch between two different 2-dimensional planes (so you can reach every point of the 3D graphic). By holding ctrl, ⬧ or ⌘ you can move the ball on one axis to independently change timbre, transposition or length.

Alternatively, you can grab and move the shadows of the ball. These are its projections on the timbre axis and the transposition/time plane, respectively

The position of the ball directly effects the numerical values and vice versa.

You can reset the ball and all numerical values to center (neutral) positions by simply double clicking in the graphic.

About the Harmonic Correction

The whole spectral structure is usually shifted when audio is transposed – no matter what method is used: digital (changing numbers in parameter box) or analog (changing the tape speed). Consequently, not only the root is transposed, but all the sound source's resonances (formants) are shifted as well – as though the whole instrument or singer is getting smaller or larger. This – of course – is not natural: voices transposed up by "normal" methods will sound like our good friend Mickey Mouse or conversely, if transposed down, like our arch nemesis Darth Vader.

The Harmonic Correction of the Time Machine II allows you to correct this unnatural spectral shift of the formants.

Alternatively, you can shift the formants without transposing. This means you can alter the physical size of the sound source's resonance body – for example to give female voices a male character and vice versa, while the pitch stays in tune.

Harmonic Correction is completely defferent to the effect of an equalizer. Both methods can not replace each other and lead to completely different results.

The quality of the Harmonic Correction depends strongly on the source material, because the algorithm has to draw "intelligent" decisions between tonal and atonal parts and handle them separately. This decision is not always definite and is related to a subjective rating. These decisions are more simple when dealing with monophonic material than with complex stereo material, but the algorithm of the Time Machine II is able to handle a complete mix; even the phase correlation of stereo recordings is maintained. At this point of time, this ability is unique to Time Machine II. Nevertheless, it may be possible that some material cannot be treated in a satisfying way. We urge you to experiment in order to obtain the best results

The Harmonic Correction is a highly sophisticated DSP process, much more complex than time compression, and therefore needs more calculation time.

If you need to save time, you can receive exactly the same result by first doing a normal transposition and then a Harmonic Correction afterwards. If you have to find the exact transpose value by trial and error, simply switch off the Harmonic Correction. As soon as you have found the right transposition, you can carry out an independent Harmonic

Hint

Correction with the same value in a second step. With this method you can even do Harmonic Correction for audio files that were transposed long ago with the old Time Machine .

Remarks on computer models

The PowerPC processor used in PowerMacintoshes and other new PPC MacOS computers is very suitable for Harmonic Correction. On these PPC machines the calculation times are comparatively short.

On computers with a 68040 processor (z.B. Quadra) the FPU – special calculation hardware – is supported. Nevertheless, this processor type is significantly slower than the PPC types, especially for these type of operations. Remember: The 68040 "LC" processor (like in the Performa 475) does not even have a FPU and is therefor much slower. The Harmonic Correction is the only process where the missing FPU is a disadvantage.

On computers with a 68030, the calculation time increases dramatically. Please remember that despite these warnings, the sonic quality of the result remains independent from the processor type.
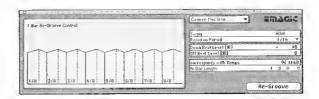
Groove Machine

The Groove Machine allows you alter the feeling, swing or groove in digital audio material in percentage steps. We call it »digital re-groove«.

Opening the Groove Machine

First ensure that the tempo of LOGIC Audio exactly matches that of the chosen audio material!

Choose **Factory > Groove Machine** in the Sample Editor. The function is executed by clicking the *Re-Groove* button.

Please see section *Operation* on page 7 - 2.

EMAGIC

Parameters

Next to *Swing* you set the percentage for the swing factor. At 50% there is no change – you normally get the best results at 55% to 65%.

The *Based on period* parameter lets you tell the Groove Machine whether the audio material should be edited on the basis of eighth note or sixteenth note swing.

The *Down beat level* and *Off beat level* parameters are where you choose whether the down beats or off beats in the audio material should be raised or lowered. Positive values increase the level, negative values reduce the level.

Please bear in mind that raising the level of normalized audio material can cause distortion (particularly on the down beats which are usually louder).   Note

The *Corresponds to Tempo* parameter automatically transfers LOGIC Audio's current tempo to the groove machine.

The length or tempo of the selected audio material must be defined,   Important
otherwise the Groove Machine cannot work accurately. The length can be defined in musical values (bars, beats, divisions and ticks) under *to Bar Length*, or you can set the tempo directly using *Corresponds to Tempo*.

Audio Energizer

The purpose of the *audio energizer* function is to increase the perceived volume of the audio material while altering the sound as little as possible.
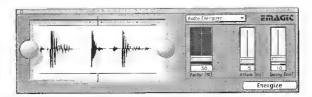
However, the maximum level of the audio data - the 16 bit clipping limit - is not exceeded. Digital distortion (which would be the inevitable result of simply increasing the level and which sounds very unpleasant) is avoided using this algorithm.

You could compare the effect to that of an analogue tape which is saturated by a high recording level . However, the distortion factor and effect on the audio material by the audio energizer is much lower.

To give you an idea of the effect, if an already normalized audio file - i.e. audio data which is already up to the limit of the dynamic range - is edited the effect is as follows: a VU meter will show a higher level indicating increased average energy in the signal. However, a peak display will show the same level since the maximum signal strength has not been exceeded.

Opening the Audio Energizer

Choose **Digital Factory** > **Audio Energizer** in the Sample Editor . For information on the effective range and basic operation please refer to section *Operation* on page 7 - 2. The function is executed by clicking the *Energize* button.

Parameters

The main parameter is *Factor*. This is where you choose the amount of editing. *0%* means no alteration while higher values produce an increase in energy. The setting you make here will depend on the audio material, situation and personal taste. Begin by trying values in the *40-100%* range. Values below *10%* will hardly have any effect, values over *100%* can lead to undesirable alterations in the sound, depending on the material. Values over *200%* are not recommended with normalized files because they will have detrimental effects on the sound and dynamics. They can also greatly increase the required computation time. On non-normalized audio data even high values can be effective because initially the overall level is increased to the maximum without affecting the sound.

The *Attack* and *Release* parameters affect the algorithm for the editing in terms of the steepness of the filter. You can try increasing these values to double or four times the amount if the result sounds too "digital" or "raw". This can happen if small elements previously hidden among the "main events" in the original are boosted, for example the reverb sometimes gets louder.

Note   The perceived loudness of the overall audio material is increased. If the material contains interference such as noise this will also be increased and sometimes becomes audible. If necessary, you can edit the result using the noise reduction function (Silencer) on a low setting.

Silencer

The silencer consists of two component functions, which can either be used separately or together:

The >Noise Reduction< lowers the level of any noise in the signal, e.g. tape noise.
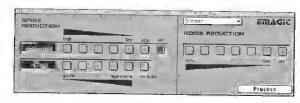
The >Spike Reduction< tries to identify and reduce "unusual" signals such as pops or clicks.

You will probably find that you will use the noise reduction more often than the spike reduction (or both together).

Opening the Silencer

Choose **Factory > Silencer** in the Sample Edit window. For information on the effective range and basic operation please refer to section *Operation* on page 7 - 2.

Noise Reduction

The purpose of the Noise Reduction is to reduce the noise components of the signal and also affect the main signal, particularly the high frequency elements.

The process is "single ended"; i.e. it edits material which is already available and there is no need to alter the signal during the recording. This has the advantage that even noise which is already contained in the signal to be recorded can be edited.

Operation

Set the *Spike Reduction* function to *off* so that only the noise reduction function is used. Click the *Process* button to execute the function.

There is only one parameter for controlling the intensity of the editing. *Off* means no edit, *Min* is the least possible edit, small numbers have a small effect and *Mox* produces the maximum possible reduction of the noise component. The "correct" value depends on the quality of the material and your own personal taste. Good quality material should only be edited using *Min* or *2*. You will probably notice only minor changes in the sound. Bad (noisy) quality material should be edited using higher values or even *Mox*. If the setting is too high the treble part of the main signal will also be reduced.

The Silencer function is optimized for normalized data. Low level material should be normalized first.

Spike Reduction

The aim of spike reduction is to identify and reduce "abnormal" signals such as pops, clicks or digital "spikes" in order to reconstruct a hypothetical "original" signal.

Operation

Set the *Noise Reduction* part to *off so that only the Spike Reduction*-function applies. Click the *Process* button to execute the function.

The *Sensitivity* parameter controls the automatic recognition of the 'spikes'. When set to *High* (sensitivity) instead of *Low* even relatively small spikes are identified. When set to *Auto* the threshold is controlled automatically by the program.

The *Method* parameter controls the intensity, i.e the way these spikes are edited. *Gentle* is the weakest level which slightly smooths the original signal, *Aggressive* the strongest. All these settings "filter" the original signal at the identified position.

By contrast the *re-build* setting completely replaces the often unusable original signal with a synthetic plausible signal at the identified points. The synthesized signal is created by analyzing the audio material surrounding these points.

Experiment with the parameters. If the *Sensitivity* is too sensitive there is the danger that very sharp parts of the main signal will be identified as spikes. Depending on the audio material it can sometimes be impossible for the program to distinguish between the two. That is particularly the case if the decision "spike or main signal" is merely a matter of taste, for example with some "click-like" bass drum sounds. In their attack phase these can have similar characteristics to static on vinyl.

Tip   If the automatic identification does not produce satisfactory results crackles can also be removed manually: just select the relevant area in the Sample Editor and carry out a spike reduction using the settings "High Sensitivity" and e.g. "Filter 5". This method is easier than manually "drawing" waveforms.

Sample Rate Converter

The sample rate converter is used for converting the sample frequency. For example, audio files which have a 48kHz sample rate

(recorded on a Hi-Fi DAT recorder and digitally transferred into the computer) can be converted to 44.1kHz.

Opening the Sample Rate Converter

Normally you will want to convert the sample rate of a whole audio file. To do this, select the whole audio file in the Sample Editor (⌘Ⓐ).

Choose **Factory > Sample Rate Convert...** in the Sample Edit window. For information on the effective range and basic operation please refer to section *Operation* on page 7 - 2. To execute the function click the *Convert* button.

Parameters

Source (HZ)

This shows the previous sample rate of the audio file. However, to enable you to change incorrectly stored sample rate formats (e.g. after editing in other programs) — or for effects — you can enter any value you like here. You should only use this function if you know what you are doing.

Destination (Hz)

Here you can enter the desired sample rate to which the selected area is to be converted.

In most professional audio circles only the 44.1 kHz sample rate is used. There is no audible advantage in using 48kHz. This format is mostly used with DAT technology into the pro-audio field.

Note

7.2   Functions

The second section of the **Factory** menu contains functions involving an interaction between MIDI and audio data.
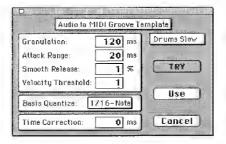
Audio-to-MIDI Groove Template

This function enables LOGIC Audio to create MIDI groove templates from digital audio material. This means you can extract the feeling (i.e. the precise rhythmic references) from drum loops or other samples containing rhythmic passages and use the resulting groove template to quantize MIDI sequences.

The following example explains how to do this using a one bar drum-loop:

*   Load the drum loop into LOGIC Audio by choosing »Add Audio File«.
*   Drag the new region into the Arrange window.
*   Now open the Sample Editor by double-clicking the region.
*   Choose »Audio to MIDI Groove Template...« from the Factory menu.

Parameters

The first four parameters control the analysis algorithm. They are listed in order of importance:

Gronulotion (ms)

This determines the time span of louder parts of the audio material from which LOGIC Audio can derive information for »velocity points« in the groove template. The most useful values are usually between 50 and 200 milliseconds, depending on the tempo of the audio material.

Attock Ronge (ms)

This tells the program how long the attack phases of the sounds in the audio material are. For example, drum and percussion instruments have short attack times of less than 20ms, while string instruments have longer attack phases. The best values for most instruments are usually between 5 and 40 ms; Many instruments are near 20 ms.

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Smooth Release (%)

This parameter is specifically for processing audio material containing sounds with a long release and/or reverb. This makes it easier to convert these sounds into quantization points. The setting here should generally be between 0 and 5%, except when processing passages with long, distorted guitars or similar sounds.

Velocity Threshold

This parameter sets the threshold below which the individual sounds in the audio material are to be ignored. In most cases the value »1« is suitable, except when processing very dense, loud material with soft background noises.

There are more options containing the following parameters:

Basis Quantize

This function enables you to add artificial trigger points at positions in the audio material where there are no trigger points present. The groove templates obtained using this method are suitable for situations where you need more quantization points than are contained in the audio material.

The identification of trigger points in the audio material is not affected by this parameter.

After choosing the *Make Audio to MIDI Groove Template* function you can then determine the limits of the template. Move the selected material in the Sample Editor so that it fits the musical bar divisions of your song. The small »triangular lines« allow you to exactly compare the trigger points in the audio material with the musical positions of »basis quantize«. Remember: the selection can be moved in the Sample Editor by holding down the ⌨ key and dragging it.

Tip

Time Correction

This parameter allows you to compensate for any time delay which may occur when external samplers or synthesizers are triggered by MIDI notes. These time delays are sometimes very noticeable if the connected device is playing a sequence which was quantized using an audio-to-MIDI groove template at the same time as the original audio material is being played. You should be able to compensate for this effect by using settings between –20 ms and 0 ms.

Instrument Type

This flip menu contains various presets for the audio-to-MIDI parameters which are suited to specific patterns in the audio material. You can use these presets as starting points for your own attempts.

Your own parameter settings are stored in the LOGIC Audio Preferences file!

At the bottom of the Sample Editor are three fields labelled: *Audio Qua*, *Basis Qua* and *Result Qua*.

Audio Qua

Displays the quantization points which LOGIC Audio has identified in the audio file.

Basis Qua

Shows the quantization points which you have chosen under *Basis Quantize*.

Result Qua

Shows the quantization positions in the new groove template which are produced by the combination of the two values above.

Tip: you can click any audio trigger point if you don't want it to be transferred to the result line or template.

When you click *Try* you can use the new groove template on the selected sequences and so try out the result.

Adjust the parameters until you are happy with the result and then click *Use*.

Clicking *Use* saves the new groove template and installs it in the current song. It then appears at the bottom of the list in the Quantize flip menu under the sequence parameters of the Arrange window. This means your new groove template is available for use whenever you need it.

Note: you can also select a region in the Arrange window and then choose **Functions > Make Groove Template** which completes the whole process in one go.

Note: when using this function you should switch off the »Search Zero Crossings« option in the Edit menu of the Sample Editor!

Audio to Score Streamer
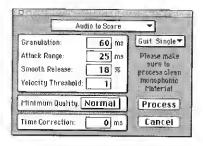
This function allows you to transform a monophonic audio recording into musical notation, also creating a MIDI sequence corresponding to the recorded melody. This allows you to have a MIDI sound module playing in unison with an audio recording or –transposed– as a second voice.

The Audio to Score Streamer creates a sequence in the Arrange window containing the optimum interpretation of the audio data. The notes are displayed in the Score window immediately after the conversion.

Opening the Audio to Score Streamer

First select the MIDI track in the Arrange window where the new MIDI sequence should be placed.

Choose **Factory > Audio to Score...**. For general information on operating the Digital Factory functions refer to section *Operation* on page 7 - 2.

7

The parameters for the Audio to Score function are similar to those used by the Audio to MIDI function to create a groove template. For details refer to section *Parameters* on page 7 - 14.

Minimum Quality is the only extra parameter which lets you choose between normal or high quality editing as a preset value of the program. This allows you to deal with situations which demand the highest possible editing quality. The *Normal* setting is more tolerant in accepting audio trigger points which are not perfectly in tune. However, this setting can also generate wrong notes. If the minimum quality is set to *High* LOGIC Audio only accepts audio trigger points which have a clearly identifiable pitch. Indistinct trigger points are replaced (according to the program's preset) by notes with a pitch of *C3* and MIDI channel *3* labelled as an *undetected mark*.

When analyzing audio material containing clearly identifiable tuning you will find that you get good results from either setting.

Click *Process to execute* the function.

A MIDI sequence containing the generated data is automatically created in the Arrange window on the selected MIDI track.

A Score window opens automatically containing the transcription of the audio file generated by the program. The Score Editor uses a score style called *Audio To Score* and three staves. This style can be edited just like a normal score style. The three staves contain the following information:

Stave 1 contains the data exactly as it was identified by LOGIC Audio and on MIDI channel 1 — clearly recognized pitch.

Stave 2 contains the data derived from LOGIC Audio's optimum musical interpretation on MIDI channel 2. For example, if the pitch is wrong or could not be clearly identified at the first analysis.

Stave 3 contains all other information provided by the program on MIDI channel 3. For example, with detuned pitches a "dummy" note is used (C3 on MIDI channel 3). This can happen if the trigger point has a very short attack or if the note has a high interference element (such as click noises or buzzing strings produced by a guitar).

A few tips on how to get the best results using the Audio to Score function:

First: you will only get good results with clearly identifiable monophonic audio material. Solo voices, strings and piano can be easily analyzed, as can any recordings with distinct pitches.

Second: experiment with different parameter settings for editing the audio data; sometimes you may need to make several attempts to discover the optimum values for a particular recording.

Quantize Engine

This function allows you to use a MIDI sequence template (within reason) on an audio recording instead of on MIDI data.

This is done by using a dynamic time compression/expansion algorithm. The function is similar to the Groove Machine except that the quantize template can reflect values other than just 8th or 16th note swing grooves. Even user defined MIDI grooves can be used.
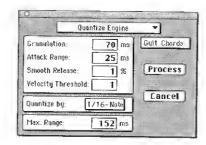
The Quantize Engine is therefore the inverse of the *Audio to MIDI Groove Template* function.

Opening the Quantize Engine

First select the audio sequence in the Arrange window to which you want to apply the groove template.

Choose **Factory > Quantize Engine...**. For general instructions on operating the Digital Factory functions refer to section *Operation* on page 7 - 2.

The parameters for analyzing the audio material are identical to the ones used in the inverse function *Audio to MIDI Groove Template*. Please refer to section *Parameters* on page 7 - 14.

Quantize by

This flip menu is where you set the required quantization. The same templates are available as for MIDI data.

Max. Range

This is where you set the maximum time in milliseconds by which a peak in the audio material can deviate from the relevant quantization point in the groove template while still being interpreted as "relevant".

Small values are suitable for editing audio material which already has a similar groove.

Large values allow you to use a groove template which deviates more from the original groove. However, this increases the risk of misinterpretation.

Operating tips:

First use the flip menu in the top right to choose a set of parameters which correspond to the characteristics of the audio material. Start by

experimenting with smaller values for the *Max. Range* parameter (»as small as possible and as large as necessary«).

Digital Mixdown

If you want to mix two or more audio sequences digitally and store them in a new audio file, first select the audio sequences in the Arrange window and then click one of them with the glue tool (or use the *Digital Mixdown*) key command.

For more details refer to section *Digital Mixdown* on page 4 - 16.

Chapter 8
Global Functions
and Preferences

8.1   Global Functions

QuickTime Support

Except for this brief section below, LOGIC's QuickTime functions are covered in the MIDI sequencer section.

QuickTime Sound

The sound contained in the QuickTime movie can only be heard via the Macintosh's internal sound system. However, the internal audio track for the film can be loaded as a file into LOGIC Audio providing the format can be converted into AIFF or SDII. You can carry out this conversion using a program like Adobe's "Premiere" — or Apple's Movie Player 2.0. Choose **Edit > Extract Tracks > Sound Track.** This creates a QuickTime movie with no pictures. Click its window and choose **File > Export** and then choose *as AIFF* in the dialog box to set the memory path. If necessary you may then have to convert this AIF file using a program like SoundDesigner from the 8 bit format to the 16 bit format (**File > Save As.** Set the file selection box to *16 Bit*).

To ensure a high picture frequency and smooth playback you should store the audio files and the film material on different storage media.   Tip

Color Display

The following information relates to the color display in LOGIC Audio. For a description of how to assign colors to objects in other parts of the program see the section on MIDI sequencer functions.

In the same way that Midi sequences are assigned the color of the track instrument after a recording, audio sequences are assigned the color of the track's audio object after a recording.

It is very easy to assign objects a color in LOGIC Audio: select the object and click the desired color in the color palette.

You can also assign individual audio sequences an individual color, or transfer the color of the track objects to all audio sequences on those tracks (by choosing **Uiew > Instrument Colors to Objects** in the Arrange window).

To open the Macintosh color palette choose **Uiew > Object Colors...**. Clicking a color then assigns it to the selected regions, audio sequences or audio objects.

You can switch the color display of regions in the Audio window on and off via the option **File > Preferences > Audio** > *Display Color in Audio Window*. Regions revert to black and white when you click the color »white« on the left side of the palette.

If a Sample Edit window is in the foreground you can use the color palette to choose the color of the waveform display. Open the color palette by choosing **Uiew > Waue Color...**.

Tip   Define a key for the global command *Object Colors...* in the Key Commands window to give you the quickest access to the color palette.

If you don't like one of the preset colors in the palette just click it and edit it in the standard color selection box which should be familiar to you from the Macintosh's color Control Panel.

Note   If you click a color in the palette while holding down ⌘ key this will alter the color of the selected track instrument in the Environment.

Note   Bear in mind that in the Environment the audio objects themselves are never actually colored. Their color assignment merely affects the audio sequences recorded with them.

»Send Maximum Volume«

This function which can either be activated via the Options menu in the Arrange window or via a global key command sets the audio tracks a value of »90« (MIDI volume 90, equivalent to 0 dB). This value is then sent to all *currently used* audio objects.

Shortage of Working Memory

LOGIC warns you whenever the available working memory is starting to run short. This information should not give cause for alarm; LOGIC will continue to carry out all functions properly with no loss of data.

However, since a lack of memory reduces the working speed, whenever you get a warning like this you should quit the program and allocate it more memory.

8.2   Song Settings

To alter the Song Settings choose **File > Song Settings** from the main menu. You will find the audio settings on the **MIDI Options** page. (You can switch pages via the flip menu at the top).

Scrubbing with Audio in Arrange

If there is a cross in the check box this means you can scrub audio and MIDI simultaneously in the Arrange window.

Send All Fader Values after loading

This option also affects the audio faders for volume, panning, etc. It ensures that after a songs is loaded the current fader values are automatically transmitted so that you can start playing the song straight away with the correct settings in place.

8.3   Preferences

You can reach the Preferences by choosing **File > Preferences** from the main menu. The settings relating to LOGIC Audio are contained on two separate pages: **Audio** and **Audio Extensions**. (You can switch pages via the flip menu at the top).

Audio

Warning before closing Sample Edit

If you have executed a destructive edit command in the Sample Editor, e.g. *Normalize* or *Fade etc. when you close the window* you will be asked if you want to Undo this edit first. Of course once you are used to editing audio data in the Sample Edit window you may begin to find this alert box irritating so this is where you can get rid of the warning.

Warning before process Function in Sample Edit (Key)

Before you carry out a destructive edit in the Sample Editor using a key command a warning appears giving you the opportunity of cancelling it before altering the data.

You can define key commands for all the destructive edit commands in LOGIC Audio, which will then be valid only if the Sample Edit window is active (gray title bar). Depending on what key commands and window combinations you are using there is a danger of executing edit commands accidentally. Thus LOGIC Audio is preset so that an alert box appears first, which you can switch off here.

Worning before process Function in Sample Edit (Menu)

This option is functionally almost identical to the previous one, the only difference being that the warning appears whenever you use a menu to execute a destructive command in the Sample Edit window.

Once you are more experienced you may not need this alert box whenever you call up an edit command via a menu, so you can switch it off here.

Ask for complete Backup...

This is where you can switch off the alert box in the Sample Editor which asks you whether you want to make a safety copy of the audio file before you destructively edit a sample. See also the section on the Sample Editor.

Use Sample Rate from Tape-Calibration in Sync

If this function is switched on LOGIC Audio uses the same sample rate as the tape calibration for any external synchronization (see Audio window). If you are using the Digidesign™ SMPTE Slave Driver to externally synchronize the ProTools system this option must be switched off.

Create Overview ofter recording

To allow you to view new recordings of audio files in the Arrange window LOGIC has to create an overview. Before it can do this the whole

audio file has to be read which can be time-consuming depending on the amount of data involved. If you want to continue working in the Arrange window without the waveform display you can switch off the creation of the overview after the recording. This applies to audio hardware which is not able to create the overview while the recording is taking place. If necessary the menu option "Update File Information" in the Audio window will recognize that the overview is missing and create it later.

Display Calor in Audia Window

If audio regions in the Arrange window are very brightly colored it can sometimes be difficult to make out the waveform display in the Audio window. You can therefore revert to a black and white display here.

Create Unda file far »Narmalize«

Storing the "Undo" files for destructive edits of audio data can take up a lot of time and memory, depending on the length of the audio data. Normalize is generally a safe and usually beneficial type of data edit. Switch this option off if you want to remove the Undo option for the normalize function.

Quick Recard without prepare af Play Tracks

Normally at the start of a recording – or playback – all audio files at the song position are prepared for playback. Depending on the number of tracks and type of system this can take anything from a fraction of a second to over a second. In some situations you might prefer to bypass this preparation of all the playback tracks to allow you to start recording immediately. In such a case you should switch on this option. Recording (and Midi playback) can then begin straight away, although the audio tracks will not start playing until a few seconds later.

Release Audia in Backgraund if Stapped

When you switch on this option LOGIC Audio releases the audio hardware whenever playback stops. This allows you to switch to another program which also needs to use the audio hardware, without having to quit LOGIC Audio first. This option works in a similar way to *Release Madem and Printer in Background if stapped* on the **Communication** page .

Enhanced 2.5.3 Playback Mode

This option uses the greatly improved algorithms for audio playback contained in Version 2.5.3. The effect is particularly noticeable in AV operation. The preset is "option switched on".

Audio Extensions

The check boxes on the left are used to activate/deactivate the relevant drivers.

You can use the *Install/Deinstall* buttons on the right of the abbreviations to install/deinstall the respective extensions. An installed extension is incorporated into the LOGIC Audio program and is not available as an independent file.

Remember that any alterations made will not become valid until the next time you start LOGIC Audio.

If you deinstall the Extensions and deactivate all the drivers you can virtually turn LOGIC Audio into a MIDI version of LOGIC which has a lower memory requirement and can run on computers with less RAM.

Mac AV

Please refer also to Chapter 11 *More About AV.*

Less tracks, fast volume response

If this option is active a maximum of 8 tracks are available which doubles the speed at which fader movements can address the audio objects. It is the default setting.

If this option is switched off a maximum of 16 tracks are available. This reduces the addressing speed when adjusting the levels or panning (fader movements of audio objects). This setting also requires more main memory (RAM), so that less RAM is available for tracks than when the option is switched on.

Don't forget that adjusting the level or panning always causes a certain amount of delay in the Apple Sound Manager.

Tip　　This option is recommended for computers with less main memory (RAM). In some cases it may actually mean that more tracks are available!

Warning　　Whenever you alter this setting you have to first *RESTART!*

Playback RAM Cache

When you activate this option you create a buffer in your computer's RAM where small regions can be accessed far quicker and be read more reliably. When using the cycle function in the Audio or Sample Edit windows, and also when using cycle or loop in the Arrange window this relieves the load on your computer's hard disk.

EMAGiC

Important: this option is only useful if your computer has enough main memory. You should allocate at least 10 MB to LOGIC Audio. This option is not activated in the default setting.

After activating this option you need to first *RESTART!*

Continuous Vol. and Pan contral

If this option is active you can control volume and panning with MIDI resolution (127 steps). This also means that you will have less tracks available. It is the default setting.

If the option is not activated the playback level of the tracks cannot be adjusted but can only be switched on/off and the panning can only be set to extreme positions (for stereo operation). This does make more tracks available however.

The reason is that a playback track which can be sent to two outputs with a variable level using the panning function uses the same amount of memory as two playback tracks.

Even if the option is activated setting tracks to extreme panning positions frees up memory which can then be used for playing more tracks.   Tip

Prevent System Overlaad

If this option is activated the playback tracks of audio objects with the highest number are switched off if there is too much data. This is a kind of »safe mode« which prevents a system crash. It is the default setting.

If this option is switched off all tracks are played as long as possible. LOGIC Audio just carries on until it reaches the limit of the system. If this limit is exceeded the sequencer will stop. This setting is a kind of »maximum performance mode« which if switched OFF in certain unfavourable circumstances can result in a system crash.

You should only switch this option off if you are an experienced user   Note
and you are aware of the possible consequences.

Clip Protection

If this option is not activated there is a danger of clipping when several tracks of audio material are set to the 0dB limit and are mixed together during playback. This setting prevents clipping by turning down the volume fader or (if several tracks are set to left or right) the panning fader.

If the option is active it prevents clipping by setting the fader to less than 90 (=0 dB). This reduces the dynamic range of the audio material during playback. It is the default setting.

8

On computers with 8-bit AV hardware the master fader (output object) should be turned down to prevent clipping. The individual track faders need not be adjusted.

Recording

If this option is active it means that recording is possible. Don't forget that you can only record on computers with 16-bit AV hardware. It is the default setting.

If the option is deactivated recording is not possible. The advantage is that you save memory (the record buffer) and you can play more tracks.

Warning   If you alter this setting you need to first *RESTART*!

Driver Delay

The *Driver Delay* parameters allow you to delay both recording and playback of all audio tracks in relation to the Midi tracks. As usual, you can also set negative delays to bring the audio output forward in time. Negative values can be used to compensate for any delays in most audio drivers, so that Midi and audio can be played simultaneously.

If LOGIC Audio recognizes your AV hardware, it will preset a value which is calculated to even out the delay in the audio driver. However, since there are many factors which can influence the timing of your system, you can also adjust this parameter yourself. You do this as follows;

Setting the Record Driver Delay

- Record the sound of the Midi Metronome on one audio track.

- Check the position of the peaks in the Sample Editor. You should display the axis in musical units (**Uiew > Bars/Beats**).

- To measure the delay, just select the data between a beat and a peak. If the peaks are too far to the left you need to increase the delay parameter; if they are too far to the right, decrease it.

Repeat this process until the peaks are exactly on the beats.

> Note for the technically-minded: if you are trying to eradicate the delay of the Midi transmission and – more importantly – the reaction times of the sound modules, you can directly record the Midi signal: connect pin 2 of the Midi plug to the ground input and pin 4 of the Midi plug to the signal input.

Setting the Playback Driver Delay

- Play the recorded audio click together with the Midi click.

• Adjust the *Playbock Driver Deloy* until both the delay and the flang-
ing become minimal (the comb filter effect reaches its maximum
frequency).

Alternatively you can record both signals together and compare them again in
the Sample Editor.

There should now be only minimal delay between Midi and audio.
Small discrepancies ("Jitter") of a few milliseconds sometimes arise for
various reasons but this cannot be avoided.

Examples of playback delays for different computers:

Computer	Driver Delay
Quadra 650	-50
PowerBook 190	-12
PowerMac 8500/120	-28
PowerMac 7500	-28
PowerMac 7100	-18

Don't forget that the value for your individual computer may be differ-
ent!

DAE

Use DAE File selector for »Add Audio File«

If you are using Digidesign hardware LOGIC Audio offers you an en-
larged file dialog box which allows you to listen to an audio file before
you load it. This window also contains extra information about the files,
such as size, format and sampling rate. If you want to use the standard
Apple dialog box instead of the enlarged file dialog box you should
switch this option off.

Use "Project" driver mode for Session 8 system

With this option, you can switch the Project driver mode on (scrubbing
possible, only 4 EQs) and off (8 EQs, no scrubbing). For more informa-
tion read section *ProTools Project driver,* on page 10 - 6.

Scrub Response

This flip menu enables you to adjust the access time for audio scrub-
bing to suit your personal circumstances.

You can choose between *Slow, Normal,* and *Fast* and *Very Fast.*

On slower computers or certain hard drives it may be better to set a slower time. When scrubbing this then helps avoid getting warning messages such as »Disk too slow«.

Please don't forget that not all hardware allows audio scrubbing.

Max. Scrub Speed

This flip menu sets a maximum playback speed of the audio material during scrubbing.

Normal - normal playback speed. This setting will help avoid any "Disk too slow" warnings from the DAE. It allows a faster scrub response setting without leading to the "Disk too slow" warning.

Double - in this setting you can scrub at a maximum of double the playback speed.

CBX

Install

The Install switch is for the installation of the DAE Extension.

Driver Mode

Classic (old ROM) - this setting is NOT recommended. Unfortunately it is the only possible setting if you are using a CBX-D5 with the original D5 ROM. Please ask your Yamaha dealer about a ROM update. The new ROM will allow you to select the "continuous playback" mode (see below). In "classic" mode you will encounter difficulties playing consecutive audio sequences on the same track. Small gaps occur during playback unless the distance between the audio sequences is at least 200ms.

Tip   If necessary you can join audio sequences with the glue tool to create a new audio file which can then be played with no problems.

Continuous playback - this is the recommended operating mode which always ensures precise timing. It is supported by the CBX-D3 drivers from Version 204M upwards and soon by the new CBX-D5-ROM also.

Note   If you want to play audio sequences from different audio files which are positioned very close together on the same track the audio files must be stored on the same SCSI medium. Otherwise gaps can occur during playback. If you cannot enlarge the distance between the sequences and you don't want to copy the audio files onto the same disk just use different tracks.

Logic

Mixed - In this setting LOGIC Audio automatically alternates the operating modes described above depending on the situation to achieve the lowest possible load on the SCSI bus. However the timing remains close to that of the continuous playback mode. Try this setting whenever you get "Disk Error" warnings.

Use mixed mode when you are recording the song and continuous playback mode when you are mixing it.   Tip

MIDI Port Unit 1

This is where you select the Midi Port where the CBX is connected. If you are using a second CBX this is addressed as »Unit 1« using the smaller SCSI ID and administers tracks 1-4.

8

Chapter 9
Appendices

9.1   Synchronization

Calibration

When you are externally synchronizing LOGIC Audio via MIDI Time Code or SMPTE you have to match the sample rate to this external time code.

The procedure is as follows:

*   Make sure that the *Use Sample Rate from Tape-Calibration in Sync* option is switched on in the **Audio** page of the **Preferences**.

*   Choose **Options > Calibrate to external MTC/SMPTE** in the Audio window.

*   Set the playback speed of your tape machine and start the tape.

*   Choose *Calibrate*.

The sample rate will be adjusted to the time code. Wait until the process is finished and the number stops changing.

*   Then press *OK*.

The calibration value will be stored in the Preferences when you quit the program and will be available the next time you start the program, so you can carry on working on your song without having to repeat the calibration. However, it is advisable to redo the calibration occasionally.

If you want to use a different time code or begin a new song you must carry out a new calibration.

If you are using the Digidesign SMPTE Slave Driver for the ProTools system no calibration is required. In this case you should switch off the *Use Sample Rate from Tape-Calibration in Sync* function in the **Audio** page of the **Preferences**.

Please note

Calibration to an external synchronization source is unfortunately not available for the following hardware:

- ProTools III without a SMPTE Slave Driver
- Session 8
- AV (internal hardware for PowerMacintosh models)

The reason is that this hardware does not support any global adjustment of the sample rate.

However, you can still use this function to establish the correct varispeed (pitch) setting for your tape machine:

- carry out the "calibration" as described above

- adjust the varispeed (pitch) setting on the tape machine until the value is as close to zero as possible.

By altering the speed of the tape machine you have adapted the recorded SMPTE signal to LOGIC's sample rate.

Automatic Calibration to the Hardware

The first time you start LOGIC Audio the program is automatically calibrated to your computer. This value is then stored in the Preferences.

You can repeat the calibration whenever needed by choosing **Options > Calibrate to internal Hardware**.

The Theory of Audio Synchronization

Sync? What is it? –
Summary of basic Principles

Probably the greatest problem in the realm of digital audio is the "two master" problem of timecode and sample rate. In every system with more than one clock source there is bound to be some drift. In the world of analog this well-known problem is under control, because the tape speed is constantly adjusted to minimize deviation between the timecode for the slave machine and the master timecode.

However, in a computer audio and timecode are not mechanically connected. The "tape speed" is equivalent to the sample rate. The timecode is equivalent (especially in a software that began with MIDI and now also includes audio) to a completely different counter which runs at a potentially different speed. There are several different ways of dealing with the problem.

LOGIC Audio supports Trigger Sync

Unlike many other programs LOGIC Audio undertakes the independent trigger synchronization of every region. For example, a digital audio region is always started at the correct timecode address. This means that at least the start of every region is perfectly synchronized to the MIDI output and external MTC or SMPTE. Regardless of the calibration and precision of the external tape speed the regions remain more or less synchronized.

If the audio hardware supports calibration to an external timecode, with the help of the calibration process LOGIC Audio can control the playback sample rate using software and thus adapt relatively well to the speed of the external master.

If your audio hardware does not support calibration to external time-   Tip
code you can try to adapt the speed of your external synchronization
master (e.g. your tape machine) to the nominal speed using varispeed.
This means you can use LOGIC Audio as a measuring device. Choose
Calibrotion to External Timecode and adjust the speed of your master
until the number shown is as close to zero as possible.

Another way of optimizing synchronization is to divide long regions   Tip
into smaller ones.

Digital Sync

However, if you have a sample rate clock which is locked to timecode you can avoid all those problems associated with trigger sync and maintain the synchronization, even for very long regions. This kind of digital synchronization (digital sync) is the "perfect" synchronization method. It is exactly what a SMPTE Slave Driver does in "ProTools Land", or a UCM in "Sonic Solutions Land".

This is also the case if you leave an AudioMedia II card in Digital Sync   Tip
mode while there is a digital audio signal coming from an AI-1 which is
locked to an ADAT serving as a timecode master... the "SMPTE Slave
Driver of the common man" in other words...

If you have Sync Problems

... See a doctor or chemist. If they can't help, read on...

Create a new song, make a new recording and see if that does the trick. Why? If an old recording on tape was not properly synchronized to timecode you will not be able to use it. One basic rule: the playback situation must be identical to the recording situation.

If everything is working fine with the new recording, this means the present setup is o.k. Then check whether anything has changed in your global setup. Has the frame rate changed? Has the tape speed changed? If you have changed a 30 fps setting, try variations such as 30 drop or 29.97.

Recalibrate your tape machine.

If the new recording is not running in sync please check exactly what is not running in sync: MIDI with audio, MIDI with SMPTE or audio with SMPTE?

If MIDI and Audio are not synchronized

If MIDI and audio are not synchronized in Internal Sync mode open the Audio window and choose the function *Calibrate to internal Hardware*.

If MIDI and audio are not synchronized in Internal Sync mode (MTC/ SMPTE) open the Audio window and choose the function *Calibrate to external Hardware*.

If none of this helps the problem lies with the frame rate. The frame rate of all connected devices must be identical. Read the next section.

If MIDI and SMPTE are not synchronized

Check all the frame rate settings. The frame rate of all connected devices must be identical, i.e. the timecodes on the tape machine, the synchronizer and in LOGIC itself.

Some synchronizers encode the wrong frame rate in MTC! In this case open the Tempo Editor, switch off the *Detect* option and set the correct frame rate manually.

Note for America: try out the different kinds of 30 fps (30 drop, 29.97 fps).

In Europe a frame rate of 25 fps is almost always used.

If Audio and SMPTE are not synchronized

Open the Audio window and choose the function *Calibrate to external MTC/SMPTE*. Please also check the Audio Preference option *Use Sample Rate from Tape Calibration in Sync*. If you are using Digital Sync (by supplying an external sample rate clock, e.g. via a SMPTE Slave Driver) you must switch off this option. If you are not using Digital Sync you must switch this option on to allow LOGIC Audio to control the playback sample rate.

If this does not help please also check the frame rate setting (see above).

9.2   Reliability

In practice the reliability of an integrated hard disk recording system depends on several factors:

- the condition of the hard disk,
- the settings of the operating system,
- the conditions on the SCSI bus,
- the quality of the audio driver software
- and the front-end software (LOGIC Audio).

As you can imagine, we do our best to exclude the latter factor as a potential source of error. LOGIC Audio has earned a reputation for being a reliable program.

However, due to the complexity and potential combinations of the system components it can unfortunately never be ruled out that errors may occur in a certain configuration. It is very probable that any errors which crop up will have something to do with the other factors mentioned above! You should therefore take note of the following sections.

Of course we would be very interested to hear of any problems which you have encountered (despite reading the following sections). Please write to us so that we can use your experiences to help other users.

If you need help urgently please contact us on our hotline (see the section on the »Hotline Service« in the first part of the manual).

Audio Drivers

LOGIC Audio can be used with different HD recording hardware. This involves using drivers. Drivers are programs which work very closely with a specific hardware and allow a higher program to control this hardware.

Incidentally, even the operating system relies on drivers when it communicates with specialized hardware components. Drivers are usually supplied by the hardware manufacturer.

The purpose of these "interpositioned" drivers is partly to ensure that any alterations (usually improvements) to the hardware do not necessarily involve any alterations to the higher software (front end software, operating system). The driver can deal with the new behaviour of the hardware and carries on behaving the same to the higher software.

For example, in AV mode drivers are accessed for the internal converter. These drivers are part of the operating system. If you are using Digidesign hardware you will probably already know the name of the driver software: DAE.

Unfortunately, often an update of the driver software does lead to a change in the way it behaves to the higher software, or to specialized problems.

For example, at one time an older version of a certain driver software worked more reliably with various front end software than the later versions.

Therefore we implore you:

When you install a new driver software do not delete the smooth-functioning old version until you have been convinced of the reliability of the new driver software by long practical use.

Of course, the newer versions of drivers usually promise greater operating reliability. Often newer drivers allow you to use functions of the hardware which were not possible with the old drivers.

We would be pleased to hear what discoveries you have made!

SCSI Bus

If there are any problems within a system that was working fine until a "problem-free" hard disk was connected, this is usually due to the SCSI bus. The same applies when you are installing a system for the first time, especially if you are using an external hard disk.

Don't forget that an HD recording system places very high demands on the SCSI bus. Consequently these problems hardly ever occur during normal "file operation".

Problem description
- When some tracks are played the activity LED of the hard disk, which indicates the write/read access, does not flash regularly for a short time, but irregularly and almost constantly.
- The playback of some tracks is constantly interrupted and extremely unreliable.

Textbook Recommendations
Always bear the following points in mind:

- Use fast SCSI hard disks (transfer rate over 1.2 MB per second, average access time below 10 ms).

Logic

- Use the hard disk for recording only; check the disk fragmentation regularly (see section *Defragmentation*, on page 9 - 21).

- Use short, screened "premium" cables.

- Terminate (only) the end of the SCSI chain. You should also switch off the active termination of hard disks which are not at the end of the chain.

In Practice

Experience with SCSI busses has proved that it is worth trying out the following checks:

- Swap the order of the cables (if possible).

- Experiment with the terminator. If the total length of SCSI cable is short, the system sometimes works better without a terminator.

- Swap an active termination (jumper on the hard disk) for a passive termination ("blind plug" on the SCSI connection) or vice versa.

- Use long SCSI cable instead of very short cable.

If you are asking why your system is now working: of course there are physical explanations for these phenomena. However, since the conditions depend on so many different parameters you can settle for the following explanation: "It's magic".

Problem description

After you connected the new hard disk the system wouldn't start again (it "froze").

Solution

The hard disk is using a SCSI ID which already exists in your system (for the internal hard disk or CPU). Change the ID of the external hard disk.

System

As mentioned already, if the system is not suitably configured this can seriously impair the audio operation. Please refer to section *Adapting your System*, on page 1 - 7. Here are some more suggestions.

Problem description

You are using System 7.1.2. The recordings contain loud interference. In addition the song position line is very "jerky" during the recording.

Solution

Due to an error in System 7.1.2 this malfunction always occurs when-ever there is too little available memory. Increase LOGIC Audio's mem-ory allocation.

Problem description

You have maximized LOGIC Audio's memory allocation, but there are still problems in AV mode.

Solution

Make sure that you also give the System some "room to breathe". As well as allowing a large memory allocation for LOGIC Audio, you should leave a few MB unused which the operating system can fall back on if necessary.

Hard Disk

Problem description

You always have problems whenever you try to use the full capacity of your hard disk.

Solution

On some hard disks access to the last cylinder is much slower than to other areas of data. There is only one solution: don't use the last MB on your hard disk, or you are taking a risk.

Driver

Even a hard disk is addressed via driver software. Depending on the system components you can sometimes have problems with certain driver software. If the hard disk is supposed to be quick enough accord-ing to the technical specifications, but in practice the performance leaves something to be desired, the solution might be different (or newer) driver software. Ask a computer specialist for advice.

Problem cases

The Silverlining hard disk driver blocks the whole system during write access (recording, destructive sample editing, copying audio files). This impairs LOGIC's timing considerably. Unfortunately LOGIC cannot get around this problem. It seems to particularly affect NuBus Macs with PowerPC processors (e.g. 7100, 8100).

Use a different driver if possible (e.g. HDT from FWB, Inc.). Don't forget to install the new driver on all connected hard disks!

Fragmentation

When you use a hard disk intensively files of different sizes are constantly being created and deleted. If you delete a file, the space that it occupied on the hard disk becomes free again. This means that the used and free areas on the hard disk gradually become mixed up and gaps arise between the zones containing the data. If a large file is created this is spread around on these various gaps between the other blocks of data — the file becomes "fragmented".

This means that the write/read head of the hard disk has to move around more than on a hard disk which does not contain fragmented files. This reduces the transfer rate of the hard disk and can interfere with reading the files; in the case of LOGIC Audio, it can affect the playback of audio tracks. The diagram shows a badly fragmented hard disk where only the bottom quarter has any room for large files.

When it writes data LOGIC Audio attempts to find enough adjacent memory. If none is found the data is just stored wherever space is available.

When making a stereo recording you should be careful not to set the default file size too large. (Audio window, **File > Size Record File**). This is because both sides of the stereo file are stored consecutively as two separate files of the preset size. Imagine therefore what happens when your actual recording is much shorter than the allocated size. The space between the end of the first file and the end of the preset area (i.e. up to the beginning of the second file) remains empty. The result is that the hard disk gets fragment relatively quickly.

A heavily fragmented hard disk: individual data blocks can no longer be stored without being fragmented.

Defragmentation

You should give LOGIC Audio a helping hand by regularly defragmenting (or "optimizing") the hard disk.

This can be done with a defragmentation program like Norton's »Speed Disk«, AlSoft's »DiskExpressII« or La Cie's »Silverlining«. Ask your com-

puter dealer to recommend the most suitable software for your hard disk!

The principle behind these programs is simple: the files are completely reorganized to produce a compact, densely written area thus leaving a single, large, free area. The next diagram shows a defragmented hard disk.

Careful   Never defragment a hard disk without first making a safety copy of all the data! Remember that nearly all the data on the hard disk has to be deleted and rewritten. You can use various media and methods to make backups, such as Digidesign's "DATa" software which enables you to store individual audio files on DAT cassette using a DAT recorder. The DAT recorder must have an AES/EBU or S/PDIF interface. However, there are more convenient methods. Ask your computer dealer to advise you on the best method to suit your equipment and requirements!

Economic Use Of the Hard Disk Memory
When you finish a production you should only keep the audio files that you actually need in the song. Any superfluous audio files should be deleted to save disk space.

LOGIC Audio makes this easier for you with some functions in the Audio window:

Deleting Unused Audio Files and Regions
Choose **Edit > Select unused** to select all audio files which are not being used in the current arrangement.

Choose **File > Delete Files** to delete the selected files from the hard disk.

Choose **Edit > Select unused** again to select unused regions and remove them with ⌫. This does not delete any data from the hard disk but merely removes the definition of these regions in the song.

All the audio files and regions now left will be in use in the Arrange window.

Optimizing Used Audio Files

Choose **Edit** > **Select all** or press ⌘Ⓐ to select all remaining entries.

Choose **File** > **Optimize File(s)** to delete all unused passages of audio files from the hard disk, i.e. all passages which are not located in regions of this song. The audio files on the hard disk will be shortened so that they contain only the regions being used in the Audio window. This usually saves a great deal of memory on the hard disk and simplifies the storage of the data on a magnetic tape system.

When using the "Optimize Files" function make sure that these files are   Careful!
not being used by any other songs. Be careful when you have several different versions of the same song.

It is therefore advisable to copy any audio files which are used by several al songs and rename them.

9.3   Digital Recording

This section contains general information which you should bear in mind when using digital recording media.

9

Setting a level

To get the best recording quality on any digital recording medium you need to set the highest possible level.

Although the normalize function allows you to maximize the level you only get the optimum dynamics by setting the highest level in the first place. The normalize function raises the amplitude of everything including noise and any quantization errors which may only be noticeable at extremely low levels.

Avoid overloading

If the amplitude exceeds the threshold value of 0 dB the result is digital distortion, i.e. overtones and screeching noises, which is due to suddenly cutting off the peak of a waveform ("clipping"). These are difficult to distinguish from the peaks of a bass drum or snare providing they are played at the original pitch. Unlike tape saturation caused by overloading analog tape machines which can be used to produce a warm, compressed sound, digital overloading is almost always undesir-

able. Again, unlike analog recording media digital systems do not have any "headroom" above 0 dB — any overloading immediately causes distortion.

Keep a close eye on the clip hold display. Limiters are particularly helpful for avoiding digital overloading.

Sampling Rate

In LOGIC Audio you can choose whether you want to record with a sampling rate of 44.1 or 48 kHz. As you probably already know, you have to keep the chosen format for all the audio files in a song.

There is no perceptible difference in sound quality between the two formats. Other factors have a far greater influence on variations in sound quality between one digital recording and another! (Quantization, quality of the converters, etc...)

Note   If possible, you should use 44.1 kHz from the start. Only this format gives you quick access to sampling CDs, if you want to digitally transfer the sound material into LOGIC Audio (for example, using the Quicktime Import functions). You also need this sampling rate for digitally transferring to a CD recorder.

The 48 kHz format is used only by consumer DAT recorders. If you have one of these DAT recorders and your system has a digital input and you want to make frequent transfers of recordings from this DAT recorder, it probably makes sense to work with 48 kHz.

In any case, when you master your audio and Midi songs onto DAT you should set the recorder to 44.1 kHz whenever possible. This is the standard for professional audio production.

If you have to incorporate recordings from a different standard into a song, you can still digitally import the material and then convert the sampling rate in the Sample Edit window using the Digital Factory (Sample Rate Converter).

Note   Don't forget that the "Longplay" format used on some DAT recorders (with 32.0 kHz and 12 bit quantization) has a discernable negative effect on the sound quality – both in terms of frequency and level.

Chapter 10
More About DAE

DAE stands for *Digidesign Audio Engine*. This is the software that "drives" all Digidesign hardware. At the time of printing, LOGIC Audio will operate with the following HDR hardware:

- AudioMedia II and III
- Session 8
- SoundTools
- ProTools II, III and IV

As Digidesign TDM systems also use the DAE (Digidesign Audio Engine), if you have one you should read the first two sections of this chapter. To use the TDM facilities on a ProTools III/IV system you need to install the *TDM Extension* software (available separately for LOGIC Audio). For information on the special features of TDM see the accompanying documentation.

10.1   Installation

10

Hardware

Please follow the manufacturer's instructions. Don't forget that you cannot use the hardware until you have installed the driver software (DAE) supplied with it.

Software

DAE

If you've managed to install all your bits of software correctly, the DAE will boot up automatically when you start LOGIC Audio. The first time you boot up, check that everything is working as you expect it to by

having a look in the Finder menu — if so, the Finder should show that
the DAE is running .

Setting up your Hardware

LOGIC Audio automatically registers the external hardware you are us-
ing when it boots up, provided the hardware is correctly installed and
turned on when you start LOGIC Audio.

However, if an error message appears, you can check whether LOGIC
Audio is experiencing problems "talking" to your Digidesign hardware
from the Hardware Setup window. For more about this window, read
the section *Setting up your Digidesign Hardware*, on page 10 - 3.

Curing Startup problems

If the DAE is not launched automatically, LOGIC Audio will tell you by
means of an error message. In this event, check the following points:

*   Is your Digidesign hardware correctly installed?

*   Is your external audio interface (if you have one) connected up
    and switched on?

*   Have you installed the DAE software correctly in your Mac's Sys-
    tem folder? There should be a folder within the system folder
    called (with true originality) the DAE Folder. This is where you
    must place any version of the DAE from v1.02 onwards.

*   Do you have the "DigiSystem Init" extension (version 2.4 or later)
    installed in the System Extensions folder within your System fold-
    er?

*   Are you using any Control Panels like "Extensions Manager" or
    "Startup Manager"? If so, check that the DigiSystem Init is being
    correctly handled by these programs.

*   Does the amount of RAM you have allocated to LOGIC Audio leave
    sufficient to run DAE? If you need to, reduce the RAM allocated to
    LOGIC Audio or the DAE, or increase your computer's RAM.

Ensure that your Digidesign software (Pro Tools or Sound Designer II) is communicating properly with your hardware.

Launching LOGIC without DAE

Launching Logic Audio with [ctrl] held down will display an dialog box asking "Launch DAE?". This option is useful for those who are using DAE with TDM and want to use Logic's MIDI and Notation capabilities only.

10.2   Digidesign Hardware

Setting up your Digidesign Hardware
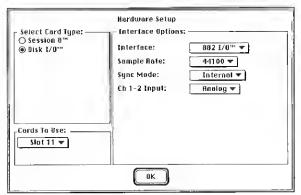
The Digidesign Hardware Setup dialogue box contains all the important System settings for your Digidesign hardware.

*   Particularly importantly, here is where you determine whether you are using analogue or digital inputs for your recordings.

*   You can also check whether there are any communication problems with your hardware — for example if your hardware is not being recognized properly.

*   If you own several pieces of Digidesign hardware, you can call these up from here.

Opening the Setup Window

You can open the Setup window from within the **Audio window** by choosing **Options > Digidesign Hardware Setup**.

Select Card Type

This is where you select the card whose settings you want to adjust. Please note that Pro Tools III hardware can be treated like a Session 8 card if you wish.

Cards to Use

If you have more than one card of the same type, this is where you select the one whose settings you want to change, by entering the relevant NuBus slot number from a flip menu showing all the possible numbers.

Interface Options

This is where you make the settings for a given card.

Interface

Some Digidesign systems offer you a choice of audio interfaces when you buy them. You set the kind of interface you're using from this box.

Sample Rate

This is where you set the sample rate you will be using in your recordings. All the audio files you record with LOGIC Audio (or any other software) will be made at the rate you enter here. You can choose either 44.1 or 48 kHz. This parameter corresponds to the setting in the Options menu of the Audio window.

Sync Mode

This is where you choose the source for the whole system's clock signal (or bit clock — pulses sent out at the sample rate frequency). You have the following options:

- Internal -

The Digidesign hardware's internal sync signal is used. It runs at the frequency you've selected in the *Sample Rate* box above.

The following note applies to Pro Tools only:
In a TDM system, only one of the cards determines the sync rate; the card in the Nubus slot with the smallest number. This *should* be the Disk I/O card! You can tell the "Master sync card" in operation by its glowing red LED.

- Digital -

The sync signal received at the digital input is used.

Any digital output, whether AES/EBU or S/PDIF, is constantly sending clock information, even if a signal is not passing through it. When this setting is on *Digital*, the sync signal is used by the Digidesign hardware not only when recording, but also as a sync clock for the whole system for playback. If this box is set to *Digital*, please ensure that the digital device connected to the input is never turned off, or you will lose your system sync signal!

Note

For example, if you are using a portable DAT recorder that saves power by turning itself off when not in use, you should select *Sync Mode : Internal* immediately after recording via the digital input.

Tip

10

CH 1-2 Input:

This is where you choose whether you want to use the analogue inputs (for which you select the *Analog* setting) or the digital inputs (for which you select *Digital*).

If you are using an audio interface with more than one pair of digital inputs (e.g. an 888 I/O), you will also be able to select any of the extra input pairs from here.

Swapping Digidesign Hardware

If you have more than one kind of Digidesign hardware installed in your system (for example Pro Tools and Session 8), you can swap between the different types by selecting **Option > Exchange Digidesign Hardware** from the Audio window (provided the Session 8 card is the first card in your computer).

Pro Tools can read audio files from the hard drive attached to the Session 8 card.

10.3 Setting a level for Recording

In a studio the recording level will normally be set at the bus fader on the mixing desk (or more generally – at the sound source). The recording machine should be set so that a level of 0 VU (Volume Units) corresponds to the relevant reference level of +6 dBu (radio), +4 dBu (professional studio) or -10 dBV (home recording).

However, if in certain situations you need to be able to set the recording level at the input of LOGIC Audio, some HDR hardware will allow you to do so:

• Open the Audio window and choose **Options > Digidesign Hardware Setup,**

• click Other Options.

You can now set the recording level for the AudioMedia card.

On a ProTools system with audio interface 888 I/O you can calibrate the recording level using the »Calibration Tool« software supplied by Digidesign. For example, this is very useful if you want to set the reference level to give you greater headroom.

10.4 Session 8 / ProTools Project

ProTools Project driver

The Project Driver Mode is supported with DAE 2.95 (or higher). After the first launch, LOGIC Audio asks which Driver Mode should be used: Project or Session 8?

You can change your decision later with the option **Preferences > Audio Extensions** > *Use Project Driver Mode for Session 8 System.*

Advantages of the Project Driver Mode
• Scrubbing with up to 2 audio tracks possible

- I/O routing for each track directly in the Audio objects
- up to 4 sends per track

Tradeoff

- Internal/External Mix Mode switch not available
- Hardware Setup not available
- Routing (when using Studio Interface) not available
- Only 4 EQs in total (distributed to 8 tracks) available

The Project Driver Mode behaves like ProTools II with 442 interface.
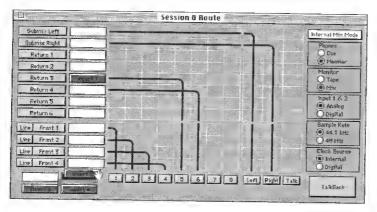
When to choose each mode?

- If you want Scrubbing, use Project Mode.
- If you want 8 EQs and Session 8 Routing, then use Session 8 Mode.

Session 8 Routing

You can determine the Session 8 routing from the audio object. Alternatively, you can use the Session 8 Route window.

Choose **Options > Session 8 Route** in the Audio window.

10

You use the window that opens to set the various Session 8 routing options. For more on these options, please refer to the Session 8 manual.

Audio Objects with Session 8 in Internal Mix Mode

As with Pro Tools II, additional sends have to be set up individually for each channel. Click on one of the fields under the word *Sends*. You use the pull-down menu that appears to set the number of the required

send. To the right of this is the control used for setting the aux send level.

Internal Mix Mode allows you to control the stereo master channels. Simply define audio objects with the setting *Output 1* for the left-hand channel, and *Output 2* for the right. The master channels can be controlled by one stereo fader if they are set to *Output 1-2*. The *Output 3/4* settings can be used for fader control of the Cue L/R channels, while the *Output 5-8* settings can be used for Aux Master Send controls.

Changes in Version 2.02

In all versions before this one, MIDI controller numbers #32 to #35 were used for controlling the Mix L/R and Cue L/R channels. From version 2.02 onwards, these controllers no longer have any effect. Instead, use the faders on the audio object (Output 1/2 or Output 3/4) or Controller #7.

Session 8: Points to Note

Overviews

Session 8 hardware cannot calculate, or consequently display any overviews (the LOGIC Audio graphics files that represent the waveforms you store) while recording; the overviews are compiled directly after recording stops. Once you've finished recording however, the compiling procedure is carried out "in the background", so you can engage other functions while the waveform display is being compiled — you don't have to sit and wait.

Scrubbing

Audio scrubbing is not possible with Session 8.

Sampling Rate

Session 8 has two fixed sampling rates: 44.1 kHz and 48 kHz. This means that you cannot calibrate it to external timecode, as this function sets the sampling rate to match the existing timecode. It's possible that Digidesign will revise this part of the software to make Session 8 compatible with this function in a future version of the DAE. As a user, you should remain in close contact with Digidesign so you can enjoy the benefits of the latest available software versions!

Lo**g**ic

10.5   Pro Tools II and Sound Tools

Since the Pro Tools II hardware has been out of production for quite a while now, we assume that if you're a user, you know your way around the system.

Changes in Version 2.02

The *Pro Tools/Sound Tools Route* window was removed from this version onwards. I/O-Routing can be carried out from the audio object itself. All I/O settings are now stored with the song and made current when a song is loaded up.

Aux sends now have to be set up individually for each channel. To control the returns (from say a Lexicon NuVerb) — but also so you can monitor the inputs — please create an audio object with the *Cha* parameter set to *Input*.

Each channel can now record via any input.

10

Chapter 11
More About AV

The AV Extension for LOGIC Audio uses the internal hardware within the Macintosh AV or Power Macintosh modelsto make audio recordings. These computers have extremely good 16-bit converters that enable the recording and playback of system sounds. They also all possess stereo Ins and Outs (as well as mini jack sockets).

11.1 What You Need

Please note also the general requirements for running LOGIC Audio in Chapter 1 5etting Up Your 5ystem To Work With LOGIC Audio on page 1.

Hardware Requirements

Computers

Any Macintosh computer with 16-bit analogue/digital and digital/analogue converters is fine for recording and playback in AV mode. Computers with 8-bit converters can play but not record.

Please note that manufacturer's specifications (particularly for the Performa Mac models) occasionally talk of "16-bit outputs". However, all this refers to is the audio outputs of the internal CD-ROM drive, and unfortunately, it isn't technically possible to use these outputs for any other purposes. On these computers, system sounds are input and output at 8-bit resolution. As a result, Performa Macs are not suited to full AV operation; they can play back, but not record.

Computers with 16-bit Converters

Of the 68k models, the Macintosh 840AV and 660AV are suitable for use in AV operation.

Of the portable "Powerbook" models, the 520, 520c, 540, and 540c are also fine for AV use.

All computers with Power PC chips and the "Power Macintosh" name — but not those with the "Performa" name — work similarly well in AV mode. At the moment, the ones that work are the 6xxx-, 7xxx- , 8xxx- and 9xxx-series.

Note   Power Macs do not require the "AV" suffix, as they already have 16-bit converters without the need for AV cards.

Computers with 8-bit Converters

Of the computers with 8-bit converters, only relatively fast models with sufficient RAM are suitable for playing back hard disk recording tracks.

Playback is not really possible on Macs with 68020 Motorola processors (or older); this is also pretty much the case with 68030-based computers.

Fast 68030-based systems with a lot of RAM may be capable of playing back a maximum of 2 tracks.

68040-based systems from the Quadra 650 and up are capable of playing back up to a maximum of 4 tracks.

Your Hard Drive

If you wish to use LOGIC Audio with AV hardware, you will need a hard drive with an access time of no more than 10 ms and a data throughput of at least 1.5 MB/s.

The maximum possible number of tracks available to you depends on how powerful your hard drive and CPU are.

You can run LOGIC Audio with an IDE drive. However, due to the more efficient bus structure we recommend SCSI.

RAM

Please note that the number of available tracks is very dependent, among other things, on the available memory (take a look at the section *Number of Tracks*, on page 11 - 5). You *can* use LOGIC Audio on a computer with 8 MB of RAM, but for best results we recommend you upgrade your computer's RAM by as much as possible (at least 16 megabytes).

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Software Requirements

Operating System

Please use **System 7.5** (or an even newer version) when using LOGIC Audio with AV/PPC hardware.

Note: you *can* use LOGIC Audio with System 7.1.2 (or older), but there's one restriction if you do: you cannot record MIDI data and audio simultaneously. This is due to an error in System 7.1.

On PowerMacintosh computers with a PCI bus we recommend System 7.5.3.

Please note the advice in section *"Memory" Control Panel,* on page 1 - 7. In AV mode it is very important to;

- set the Volume Cache value to 32 kB, and
- switch **off** virtual memory.

(32 Bit Addressing should always be switched on anyway in order to run LOGIC).

Bear in mind that some installation programs alter these settings! If you experience problems with audio operation after installing some new software, check to see whether these settings have been changed.

Important

Tip

Apple Sound Manager

If you're using the AV extension you also need Apple's Sound Manager 3.0. (This is already on board if you're using System 7.5 or later). The Sound Manager is included with the LOGIC Audio package, and is automatically installed.

Note: installing Sound Manager 3.0 in System 7.5 should not cause any problems, but should still be avoided.

LOGIC Audio is always shipped with whatever the current available version of Sound Manager is at the time of shipping.

LOGIC Audio

Please set the memory allocated to LOGIC Audio to the highest possible value. The preset RAM allocation has been deliberately set quite low so that users with DAE hardware can still run the program on smaller computers with only 8MB of RAM. The DAE software must be run in tandem with LOGIC Audio — so there has to be enough RAM to run

11

both programs at once. However, if you're using AV hardware, the DAE software is unnecessary.
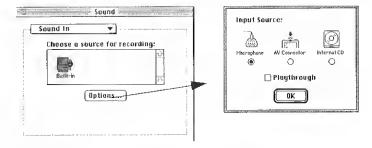
11.2   Recording - Source and Level

Sound Control Panel

To run LOGIC Audio, please make the following adjustments in your Mac's "Sound" Control Panel:
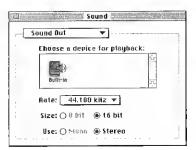
Sound In

Click on Options and select the required input for recording.

Sound Out

Please select *44.100 Hz* and *16 bit Stereo*.

Volume

The volume slider in the "Sound" control panel is situated *after* the output from LOGIC Audio (output objects).

This means that you will only be able to control the entire dynamic range with LOGIC Audio's output object if the volume slider in the "Sound" Control panel is set to the maximum level.

11.3 Number of Tracks

We'd love to be able to print a table here that would tell you simply how many audio recording and playback tracks your computer will give you when working with LOGIC Audio. Sadly, it's not that simple — the number of available tracks depends on many different factors.

When it is booted up, LOGIC Audio checks your computer system, and places in the Environment the maximum number of audio objects possible with your hardware. Equally, when you create a "New Song", you are automatically presented with the maximum possible number of tracks for your setup. The actual number depends on your sound card.

You can sometimes change the number of tracks available to you by altering the settings in the Preferences. However, you may have to make other sacrifices in order to do this....

Number of available tracks

Essentially, the maximum number of available tracks depends on three factors:

- How powerful your **Computer** is;
- How fast your **Hard Drive** is; and
- How much **RAM** you have.

The power of your computer is in turn dependent on various factors:

- Extensions;
- Control Panels; and
- How many programs you have running at once.

These three things are capable of reducing the processing power available to LOGIC Audio, so that fewer tracks are available to you. Consequently, try and avoid using several programs at once, and remove from your computer all the extensions and control panels you don't need.

To simplify the process of calculating of the number of available tracks, we've assumed below that you're using a **hard drive** with a 10 ms access time and a data throughput of 3 MB/s. A drive like this is sufficiently fast enough to run LOGIC Audio.

Don't forget that severe fragmentation of your hard disk can reduce its efficiency. Slower disks can also lead to less tracks being available, as well as less reliable audio playback.

Working memory

Please allocate as much RAM to LOGIC Audio as you can spare.

To do this, use the "Information" dialog box in the Mac **Finder**. You can access this by selecting **File> Get Info** (⌘ *i*).

For more information, take a look at the section *Memory allocation*, on page 1 - 10.

The more RAM you allocate to LOGIC Audio, the more tracks you'll get — it's that simple.

Minimum Values

RAM allocated to LOGIC Audio	Number of available tracks
5.8 MB	4
8 MB	8
20.5 MB	16

You can allocate any amount of RAM you like to LOGIC Audio. The relationship between RAM and number of tracks is not linear — so although you can have 8 tracks if LOGIC Audio is allocated 8 Mb of RAM, you may only get 10 tracks with 12 MB of RAM.

It's not currently possible to obtain more than 16 tracks.

Please note that these guidelines are *entirely* dependent on the above-mentioned factors, and should not be misconstrued as guaranteed values. Important

We've put it to the test!

We've performed detailed tests to enable us to give a more concrete opinion on the number of tracks available with various kinds of computer.

Please note again that the following values cannot be guaranteed under all circumstances, as a result of all the factors mentioned above.

Two kinds of tracks are shown; those with freely adjustable pan positions, and those in which only hard left and right positions are possible (tracks with freely adjustable pan require more processing power). Simply add the numbers in both columns together to get an idea of the total number of tracks.

Mac Model	RAM allocated to LOGIC	Number of tracks with freely adjustable pan settings	Number of tracks with hard pan settings only
840AV	10M8	8 (with free pan settings)	
660AV	10M8	6	0
6100/60	10MB	8 (with free pan settings)	
6100/66	10M8	8 (with free pan settings)	
7100/66	8M8	8 (with free pan settings)	
7100/80	10M8	8	0
7100/80	22M8	10	6
8100/110	8M8	8	0
8100/110	25MB	13	3
9500/132	9,5M8	8	0
9500/132	24M8	16	0
P8 520/540	12M8	0	4

11

This table does not show "hard and fast" values either; tracks with free pans and hard pans can be freely mixed.

On the smaller AV Macs, the available processing power is reduced to such an extent by audio playback that simultaneous waveform editing in the Sample Edit window is no longer possible.

We'd like to thank the Hamburg-based company Systematics for their friendly help and support in carrying out these tests.

True number of tracks

If you've followed all the advice we've given on computers, hard drive and RAM allocation, the only deciding factor remaining is the settings that are stored in the Preferences.

You can make the most striking difference to the number of available tracks with the option *Less trocks, fost volume response.*

In the default setting (with this option active), the number of available tracks is limited to 8.

If you deactivate this option, you'll then have to restart. Following this, you should notice that there are less track objects in the Environment than previously.

The difference is that you will be able to obtain far more tracks if you now allocate LOGIC Audio more RAM — assuming, of course, that your hardware allows you more tracks than what you have already.

The disadvantage of this setting is that the playback level now reacts more slowly to changes in the fader position. The current reaction time is relatively slow at the other setting as well*.

Note   If you wish to automate fader movements, you should input them graphically, and move your MIDI sequences forward with the aid of a negative Delay setting so they match the correct timing of the "automation data" (i.e. your stored fader movements).

*The slow fader reaction time is due to the current version of Sound Manager.

If you construct your audio arrangements so that your work doesn't include any changes of volume or pan settings, and uses only tracks featuring hard pan settings (stereo tracks), you should be able to obtain even more tracks by turning off the option *Continuous Vol. ond Pon control.*

If you've completely finished recording a song, and need only to arrange and mix it, you may be able to gain more tracks (or play back existing ones more smoothly) if you turn off the *Recording* option. However, turning this option Off or On does require a subsequent restart of LOGIC Audio first.

Use this setting if you're using your computer for post-production only.   Tip

11

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